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ABSTRACT

A project revised the existing Occupational Safety Program at Joliet Junior College (JJC) to indicate an AAS degree option in Industrial Hygiene Technology (IHT). Its objectives were to (1) utilize, where possible, existing courses within the college's curricula; (2) align the structure of the proposed curriculum with accreditation/certification criteria for Industrial Hygiene Technicians as set forth by the American Board of Industrial Hygiene (ABIH); and (3) create an informational package describing the new program and conduct dissemination activities. A survey of technical colleges identified those having IHT curricula and/or courses to discern trends in education requirements. Fifty-three courses from existing JJC curricula were submitted to 133 industrial hygienists for suitability ranking within an IHT model curriculum. A certified industrial hygienist with a background in training and education was hired as a consultant to evaluate surveys and develop a sequence of courses for the model curriculum. Consultant liaison activities ensured that the program was in line with ABIH accreditation standards. Brochures with accompanying slides were developed to promote the program. Visitations established IHT internship stations and did preliminary program promotion. (Extensive attachments include the ranking survey and results, consultant's report, and course outlines for Industrial Hygiene I and II.) (YLB)

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ED189381

INDUSTRIAL HYGIENE TECHNOLOGIST MODEL

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Department of Adult, Vocational and Technical Education

Springfield, Illinois

June 1980

The Industrial Hygiene Technologist Model, #R-31-10-X-2.2.2-306 was developed pursuant to a funding agreement with the Illinois State Board of Education/Department of Adult, Vocational and Technical Education/Research and Development Section, 100 North First Street, Springfield, Illinois 62777. Opinions expressed in this Report do not reflect, nor should they be construed as policy or opinion of the Illinois State Board of Education or its staff.

INTRODUCTION

An Industrial Hygiene Technologist (IHT) is a person who, by virtue, of special studies and training, has acquired proficiency in an aspect or phase of industrial hygiene, e.g., air sampling, monitoring, instrumentation, special investigations, special laboratory procedures. Duties include but are not limited to the following: maintain required OSHA records; conduct health and safety committee meetings; interview employees concerning hazards on the job; maintain records on individual employee exposures; collect air samples; analyze results of air quality monitoring; measure noise and vibration levels; determine workers' total noise and vibration levels; determine workers' total noise exposure; monitor radiation levels; conduct walk-through inspections to identify potential hazards.

Industrial Hygiene Technology (IHT) had been identified in the August 1978 DAVTE Study, Current and Future Employment Opportunities in New and Emerging Occupations Within Illinois, as showing a considerable demand for qualified personnel, but it also shows a lack of existing curricula preparing individuals for entry into the occupation. At the present there are no training programs in Illinois specifically designed to prepare people to become Industrial Hygiene Technologists. The lack of qualified IHT's has forced many employers to utilize the more highly skilled professional industrial hygienists to perform the duties of technologists.

This report reflects the outcomes of a project undertaken by Joliet Junior College in developing a two year Associate Degree option for students in Industrial Hygiene Technology within its existing Occupational Safety Program.

FINAL REPORT

June 30, 1980

DAVTE Funding Agreement Number: R-31-10-X-2.2.2-306

Official Project Title: Industrial Hygiene Technologist Model

Project Director: Donald E. Ernst

Funded Agency: Community College District 525
Joliet Junior College

Time Period Covered: September 1979 - June 1980

FINAL REPORT ABSTRACT

TITLE: Industrial Hygiene Technologist Model

PROJECT DIRECTOR: Donald Ernst, Coordinator Occupational Safety Program

INSTITUTION: Joliet Junior College

LOCATION: 1216 Houbolt Avenue, Joliet, IL 60436

OBJECTIVES OF THE PROJECT:

The goal of this project was to revise the existing Occupational Safety Program at Joliet Junior College to include an AAS Degree option in Industrial Hygiene Technology (IHT). One objective was to be accomplished by utilizing, when possible, existing courses within the college's curricula. Another objective was to align the structure of the proposed curriculum in Industrial Hygiene Technology with accreditation/certification criteria for Industrial Hygiene Technicians as set forth by the American Board of Industrial Hygiene. A final objective involved the creation of an informational package describing the new program and the conducting of activities to disseminate this information.

PROCEDURES OF IMPLEMENTATION:

Procedures completed to accomplish the project objectives involved a survey of technical colleges identified as having IHT curricula and/or courses to discern trends in educational requirements for IHT's. Fifty-three courses from existing Joliet Junior College curricula were submitted to 133 professional industrial hygienists for ranking as to suitability within an IHT model curriculum. A certified industrial hygienist with a background in training and education was hired as a consultant to evaluate the surveys and develop a sequence of courses for the college's IHT model curriculum. The consultant also established liaison with the American Academy of Industrial Hygiene to insure that the direction taken in developing the new program was in line with accreditation standards that were currently being developed by the Academy for the American Board of Industrial Hygiene. Ten thousand brochures were developed along with a set of slides to aid in promotion of the new program. Visitations were conducted to establish IHT internship stations and do preliminary promotion of the program prior to its scheduled formal offering as part of the Associate Degree Program in Occupational Safety and Health in the Fall of 1980.

CONTRIBUTION TO VOCATIONAL & TECHNICAL EDUCATION:

Joliet Junior College and possibly other institutions will utilize this Industrial Hygiene Technologist Model, which will affect potential Occupational Safety and Health students and potential employers in Illinois with Industrial hygiene concerns.

PRODUCTS TO BE DELIVERED:

Twelve copies of this Final Report of the procedures developed in this grant were delivered to IOE/DAVTE in July, 1980.

PAID PARTICIPANTS IN ACTIVITY

1. Donald E. Ernst - Project Director
   1216 Houbolt Avenue
   Joliet, Illinois 60436

   Institution: Joliet Junior College - District 525

Mr. Ernst, an instructor within the Public Service Department for the past five years, developed the Occupational Safety Program and has been coordinating its activities since 1976. In addition to classroom instruction in occupational safety courses, he has supervised the program's part-time teaching staff as well as organized and coordinated the Occupational Safety Advisory Committee. He has additional responsibility for program recruitment and serves as the academic advisor for students enrolled in the safety program. He is a member of the National Safety Council and the American Society of Safety Engineers.

2. Anthony J. Towey - Certified Industrial Hygienist (Consultant)
   1447 Witcomb Avenue
   DesPlaines, Illinois 60018

Mr. Towey is presently an Instructor at the Occupational Safety and Health Administration Training Institute In Rosemont, Illinois. He is a Certified Industrial Hygienist and is responsible for the training of all Federal Industrial Hygiene Compliance Officers and the supervision and monitoring of all facets of health and training curriculum. In addition he is a member of the American Public Health Association and American Industrial Hygiene Association (AIHA). He is a past member of the Board of Directors of the AIHA and is currently Secretary of the Chicago Chapter of the AIHA.

FINAL PRODUCTS ABSTRACT

This Report is the final product of this project activity.

CONFERENCE/WORKSHOP SUMMARY(S)

Conferences and/or Workshops were not intended to be part of this project activity.

RESOURCE LISTINGS

Research on this project identified two major publications which provided guidance through the development of the project. They were:

1. Curriculum Guide for Occupational Safety and Health Technicians, 1972 California Community Colleges.
2. Development of Associate and Baccalaureate Degree Programs for Occupational Safety and Health Personnel., 1972, U.S. Department of Health, Education and Welfare.

These materials were made available without charge to the project and have been placed in the Joliet Junior College Library for public access.

PROJECT ACCOMPLISHMENTS AND ACTIVITIES

Objective I - To revise the present Occupational Safety Program to include an Industrial Hygiene Technologist Certificate and AAS Degree Option

The existing Joliet Junior College programs in Occupational Safety did not offer a Certificate or Associate in Applied Science (AAS) Degree option in Industrial Hygiene Technology. The existing Certificates and AAS Degree

in Occupational Safety prepared a student to be a safety generalist and were not geared to meet the specific needs of the Industrial Hygiene Technologist (IHT). The purpose of this proposal was to conduct an in-depth investigation to determine whether existing courses with Joliet Junior College curriculums contained the content and quality to meet the educational and training needs of the IHT.

Procedures Utilized in Accomplishing Objective I

Review of the Literature (Procedure 1.1):

A national survey of 32 selected educational institutions with certificate and two-year degree training for Industrial Hygienist was conducted. These schools were identified by the National Institute for Occupational Safety and Health to be known for courses and/or programs in the Industrial Hygiene Technology (IHT) area. (See Attachment #1).

Of the 32 requests made, 22 (69%) institutions responded to our inquiry. Interestingly, the survey revealed that eight (8) of the respondents indicated no course offerings or programs in the IHT area. Of the remaining 14 schools, only two (2) were identified as having a specific Industrial Hygiene (A.A. Degree) curriculum. They were:

1. Northeastern Christian Junior College, Villanova, Pa.
2. Delgado College, New Orleans, La.

The remaining 12 institutions offered what equated to be "generalists" safety degrees very much like the existing Occupational Safety Degree at Joliet Junior College. Although these schools offered a course or two in the industrial hygiene area there was no structured curricula designed to specifically prepare a student for the IHT field.

The preliminary research also revealed several publications which provided guidance through this project. These resources included, Curriculum Guide for Occupational Safety and Health Technicians, 1972 California Community Colleges and Development of Associate and Baccalaureate Degree Programs for Occupational Safety and Health Personnel, 1972, U. S. Department of Health, Education and Welfare.

Local Needs Assessment (Procedure 1.2):

The Advisory Committee that serves the existing Occupational Safety Program at Joliet Junior College provided the nucleus in assessing local needs in the IHT area. This committee, as early as April of 1979 recognized the need for a specialty concentration in a number of safety areas including Industrial Hygiene. At their April 1979 meeting the committee recommended to the college the development of a degree concentration in this area.

The representation of the committee reflected a diversity of occupational areas all utilizing the services of industrial hygiene professionals. Committee member, Ms. Cynthia Weaver, an industrial hygienist with the Technical Support Division of the Occupational Safety and Health Administration (U.S. Department of Labor) took a special interest in this project and assumed the responsibility of coordinating this project for the Safety Advisory Committee. As a former OSHA compliance inspector in the northern Illinois area, she had a first-hand look at the industrial hygiene needs of business and industry in the area served by Joliet Junior College.

In completing its needs assessment task the committee identified 53 possible IHT oriented general and specialized courses from existing Joliet Junior College curricula (Safety, Biological Sciences, Physical Sciences, Mathematics and Environmental Control Technology). These

courses, in the professional opinion of the committee, would provide the raw material for further refinement into a specific sequence of courses for a Certificate and AAS Degree in Industrial Hygiene Technology.

Develop a Specific Sequence of Courses (Procedure 1.3):

A survey instrument (Attachment #2) was designed containing a list of the 53 courses and their descriptions that were identified as potential core courses by the Advisory Committee. The first "refinement" stage involved the ranking of these courses by practicing industrial hygienists. A list of industrial hygiene consultants registered with the American Board of Industrial Hygiene (ABIH) was obtained through the cooperation of the Board (See Attachment #3). The list contained a national representation of over 100 individuals with representation from the state of Illinois. Additional individuals were also identified as participants. These respondents were selected industrial hygiene representatives from the federal Occupational Safety and Health Administration (OSHA), National Safety Council, Three Rivers Manufacturers Association, Illinois Environmental Protection Agency and the Illinois Department of Public Health. The entire group surveyed totaled 133.

The survey was mailed on January 15, 1980. Seventy-two surveys were completed and returned representing 54% of the group surveyed. Responses tallied upon receipt and evidenced some definite trends toward a specific IHT course sequence. In addition, written comments added to the survey by respondents were categorized. Survey results are included as Attachment (#4) to this report.

The final refinement process of developing the curriculum model for Industrial Hygiene Technology involved the evaluation of the survey

recommendations by a certified Industrial Hygienist. Care was taken in selecting a qualified individual who had experience in industrial hygiene training and education. This was to insure the selection and development of courses that delivered practical and reality-based education to the classroom as well as appropriate amounts of theory.

In developing the final sequence of courses a good look at existing courses offered throughout the college was taken prior to developing new courses. As a result it was only necessary to develop one new specialty course, Industrial Hygiene II (Attachment 5-B) and modify one existing course, Industrial Hygiene I (Attachment 5-A) in order to complete the implementation of the IHT degree option. The creation of a large number of new courses was not necessary to support to IHT curriculum due in large part to the existence of a "sister" program, Environmental Control Technology, within the college curricula.

The Industrial Hygiene Technology Model as developed by Joliet Junior College represents a joint venture in interdisciplinary cooperation. This model when implementated should provide the Industrial Hygiene Technology student with:

a. adequate academic credentials and skills to seek employment as an Industrial Hygiene Technologist,

b. a sufficient academic background to support the student's preparation for IHT Certification by the American Board of Industrial Hygiene,

c. a sound academic foundation from which one could continue their professional development.

Attachment #5 of this report contains the Consultant's Report and the complete format and rationale for the proposed Industrial Hygiene Technology Degree option model for Joliet Junior College. Figures 1 and 2 that appear on the following pages provide an overview of the course sequencing and a list of the course descriptions.

Associate Degree In Applied Science

Occupational Safety

INDUSTRIAL HYGIENE TECHNOLOGY OPTION

FIRST YEAR

1st Semester		Cr.
MATH 121	Technical Mathematics	3
CHEM 101	General Chemistry	5
ECT 101	Intro to Environmental Technology	3
SPCH 101	Principles of Speech	3
OCS 105	Industrial Hygiene I	3
		17

2nd Semester		
MATH 122	Technical Mathematics	3
CHEM 102	General Chemistry	5
MGMT 103	Occupational Safety and Health Act	3
OCS 106	Industrial Hygiene II	3
ECT 112	Environmental Biology	3
		17

Summer		
OCS 210	Internship in Occupational Safety (Industrial Hygiene Placement)	3

SECOND YEAR

1st Semester		Cr.
PHYS 103	Technical Physics	4
ECT 123	Sources of Air Pollution	3
ECT 120	Ambient Air Sampling	4
ECT 110	Instrumentation	3
ELECTIVE	Social Science	3
		17

2nd Semester		
PHYS 104	Technical Physics	4
ECT 121	Intro to Source Sampling	4
ECT 125	Air Pollution Control	5
ENG 112	Technical Report Writing	3
		16

TOTAL HOURS REQUIRED 70

FIGURE 1 - Industrial Hygiene Technology Model Course Sequence

Figure 2.- Course Descriptions

OCS 105 Industrial Hygiene I 3-0-3
An introduction to the problem of organic or systematic damage to the human organism as a result contact with potential health hazards unique to certain work tasks or work places. Emphasis on hazard recognition of many common occupational health problems. A survey of governmental health regulations is included as well as prevention and control methods. Required for all safety students.

OCS 106 Industrial Hygiene II 3-0-3
A continuation of OCS 105, Industrial Hygiene I for the occupational health student. This advanced course deals with hazard recognition in the areas of noise, radiation, and thermal stress. Principles of ventilation are discussed and demonstrated. The student is familiarized with personal protective equipment. Prerequisites: Math 121, Chemistry 101, Occupational Safety 105, or demonstrate proficiencies to the instructor.

OCS 210 Internship in Occupational Safety 0-15-3
A field experience to enable the safety student to gain insight into the operational, administrative and supervisory responsibilities of a safety unit within business, industry or government. The student will be under the supervision of the instructor and an official named by the participating agency. A planned outline of activities with an appropriate balance between assignment to routine tasks and more creative endeavors will serve to guide the student through this experience. For students participating in this course, 3 semester hours of credit would be assigned for 15 clock hours per week for 16 weeks, for a total of 240 contact hours with the participating agency per semester.

ECT 101 Intro. to Environmental Technology 3-0-3
Fundamentals of air and water pollution technology, including sources of pollution, measurement of pollution and environmental quality, government regulations and basic pollution control technologies. Prerequisite: None.

ECT 110 Instrumentation 2-2-3
Fundamentals of chemical instrumental analysis, including sampling, standardization and calibration techniques. Interpretation and application of electrical, optical and thermal measurements in instrumental analysis as applied to environmental analysis. Prerequisite: Chem 100, Math 121, 122 recommended.

ECT 112 Environmental Biology 3-0-3
A course designed to describe and analyze the biologic and health effects on man and his environment caused by man induced pollution. Includes an overview of basic ecologic principles. Prerequisite: ECT 101.

ECT 120 Ambient Air Sampling and Analysis 2-4-4
Principles and practice of ambient air sampling; ambient survey sampling methods and analytical techniques applied to particulate and gaseous pollutants. Prerequisite: None.

ECT 121 Introduction to Source Sampling and Analysis 2-4-4
Review of ambient sampling. Gas laws and psychometry. Methods of determination of gas velocity and flow rate. Equipment and preparations necessary for source sampling for particulates. Prerequisite: ECT 120.

ECT 123 Sources of Air Pollution 3-0-3
Familiarization of the major industrial processes with respect to raw materials, processing methods and equipment as they relate to types and quantities of air pollutants. Methodology of source emission inventories. Prerequisite: ECT 101.

ECT 125 Air Pollution Control 3-4-5
Objectives and methods of air pollution control. Control equipment classes studied include mechanical collectors, filtration devices, wet collectors, electrostatic precipitators, gas absorption, adsorption and incineration. Also, equipment testing to evaluate performance of control equipment and field trips to observe practical use of control equipment. Prerequisite: ECT 101

MATH 121 Technical Mathematics 3-0-3
A course including the topics of mathematics beyond high school geometry needed in the development of subjects covered in the technical curriculum. Prerequisite: Successful completion of elementary algebra and elementary geometry

MATH 122 Technical Mathematics 3-0-3
A course including the topics of intermediate mathematics needed in the development of subjects covered in the technical curriculum. Topics covered are logarithms, right triangles, vectors, trigonometry, trigonometric solutions of triangles, other applications of trigonometry, solving trigonometric equations and graphs of trigonometric functions. Prerequisite: Mathematics 121

CHEM 101 General Chemistry 4-3-5
The following topics are discussed: atomic theory and structure, bonding, nomenclature, stoichiometry, phases of matter and solutions. The laboratory complements these topics. A student may not receive credit for both Chemistry 100 and Chemistry 101. Prerequisite: One year of high school algebra or Math 094. Fall, Spring, Summer.

CHEM 102 General Chemistry 4-3-5
This is the second semester of a year sequence in General Chemistry. The topics discussed are colloids, thermodynamics, kinetics, equilibrium, electro-chemistry, coordination compounds and nuclear chemistry. The laboratory complements these topics. Prerequisite: Chemistry 101 or written consent of the department chairman. Fall, Spring, Summer.

PHYS 103 Technical Physics I 3-2-4
An introduction to the basic concepts of physics with an emphasis on applications to modern technology. The major topics are mechanics and heat. Designed for students in career education, particularly the technical programs. It is recommended that students take Math 121-122. Prerequisite: Math 090 or equivalent. Fall

ENG 112 Technical Report Writing 3-0-3
A preparation of written technical reports through the use of technical and trade literature. Course of special interest to technical and engineering students.

SPCH 101 Speech 3-0-3
Designed to teach students to recognize the essentials of effective spoken communication whether from a platform or in an informal situation, whether in private or in public and to give them the opportunity to practice the skills and demonstrate the principles of such communication. The degree of formality or informality will depend on the instructor.

MGMT 103 Occupational Safety and Health 3-0-3
Review of the Occupational Safety and Health Act of 1970; employee-employer responsibilities under the Act. Role of management in establishing a viable safety program within the company. Continuing role of management in safety and health programs

Implement the Course, OCS 202 Fundamentals of Radiation Protection (Procedure 1.4)

In the preliminary stages of this project it was thought that this course would be needed as part of the course requirements for the IHT model. During the refinement stage this course was omitted from the final sequence of courses as a matter of necessity due to boundaries imposed by the requirements of staying within credit hour format for the associate degree. Although this course would have been desirable, its necessity was replaced by the inclusion of a thorough Radiation Hazards unit within the new developed OCS 106, Industrial Hygiene II.

Present the Final Draft of the AAS Degree in IHT to the JJC Curriculum Committee for Review and Approval (Procedure 1.5)

The final proposal for the Associate Degree in Industrial Hygiene Technology was presented to the Joliet Junior College Curriculum Committee on April 30, 1980. The proposal was unanimously approved.

Submit IHT Degree Proposal to the Illinois Community College Board for Review and Approval (Procedure 1.6)

The Industrial Hygiene Technology program was submitted to the Illinois Community College Board in May 1980 as a degree option within the existing Occupational Safety curriculum. On July 8, 1980 the Board advised approval of the two IHT courses submitted as part of the program content. However, the Board recommended resubmission of the IHT program as a separate degree and not an option under the existing safety program. This modification is in accordance with ICCB Policy #6.01.03 which requires that "options" which expand a previously approved degree program be limited only to the award of Certificates. No problem is foreseen in the final approval of the IHT Associate Degree once the formality of resubmission is completed.

Objective II - Seek approval from the American Board of Industrial Hygiene insuring that the academic content of the Degree Option meet Certification Requirements

The certification of Industrial Hygiene Technologist was begun by the American Board of Industrial Hygiene (ABIH) in 1976 as a recognition of the growing need for technicians to work with professional industrial hygienists.

The minimum eligibility requirements for admission to the examination are:

1. Good moral character and high ethical standing.
2. Five years of experience in industrial hygiene under the direction of a Certified Industrial Hygienist, subsequent to receipt of a high school diplome.
   a. An associate degree from an accredited institution in engineering, industrial hygiene, or environmental sciences may be accepted by the Board as equivalent to two years of experience.
   b. Completion of two years in an accredited college or university with satisfactory completion of introductory courses in chemistry, physics, biology, and mathematics may be accepted by the Board as equivalent to one year of experience.
   c. The applicant must have spent at least 25 percent of his/her time in industrial hygiene activities during each year for which credit is claimed.

The Project Director was advised in November of 1979 that the American Board of Industrial Hygiene (ABIH) in conjunction with the American Academy of Industrial Hygiene was currently engaging in committee work to establish national accreditation standards for Industrial Hygiene education programs. The ABIH did not know when accreditation standards would be finalized and made public. The ABIH did advise that it would not be "endorsing" any education programs until the accreditation package was approved and the standards were set forth as policy.

In a letter from Mr. John D. Yoder, President of the American Academy of Industrial Hygiene, dated March 12, 1980, (Attachment #6) the Project Director was advised that the curriculum formats as outlined in the HEW report referred to on pages 2 and 4 of this report, would most likely be the guidelines for two-year programs. Personal contact between the Industrial Hygiene consultant on this project and the Academy Committee on the Accreditation of Industrial Hygiene programs led to the following information as quoted from the consultant's report.

> "In setting up this curriculum, I have sought out the assistance of Allen L. Cudworth who is Chairman for the committee on the Accreditation of Industrial Hygiene programs. In our discussion, I was informed that the committee will meet during the National Conference which is scheduled for the week of May 19-23, 1980, in Houston, Texas. Mr. Cudworth indicated that the feeling of the committee in previous meetings was that they were more in favor of a generalized program in the area of the Associate degree program. It is my opinion, based on my conversation with Mr. Cudworth, that the sequence that I have proposed for Joliet Junior College will meet or exceed the criteria that eventually will be developed by his committee."

Objective III - To disseminate information about the new Industrial Hygiene Technologist options

Procedures Utilized in Accomplishing Objective III

Develop an IHT Information Brochure (Procedure 3.1)

Take Pictures for the Brochure and for a Slide Production (Procedure 3.2)

Revise the Present Occupational Safety (on Site) Recruitment and Marketing Presentation to Include a Slide Presentation on the IHT Option (Procedure 3.3)

Revise the General Brochure and College Catalog to Include the IHT Options (Procedure 3.4)

Procedures 3.1 through 3.4 were completed and resulted in a delivery package to aid in the promotion of the Industrial Hygiene Technology Program. Three thousand impact brochures were printed (Attachment #7) specifically outlining the Industrial Hygiene Technology program. An additional ten thousand brochures (Attachment #8) which included the Industrial Hygiene Technology option as part of the college's existing Occupational Safety and Health program were also prepared depicting various Industrial Hygiene duties, functions and activities. These slides are to be utilized to enhance the presentation of the program before students, counselors, instructors in the health, science and vocational fields as well as employees and employers in business, government and industry.

Make Site Visitations for Program Promotion, Recruitment, and Marketing (Procedure 3.5)

This procedure involved the site delivery of the promotional package as previously described. Some preliminary visits to area industries were conducted to inform employers and employees of the activities of this

project and identify potential internship work stations. An oral presentation was made before a group of high school counselors representing the schools within the college district during March of 1980. However, the balance of this procedure will be carried out when word is received on the final approval of the Industrial Hygiene Technology Program by the Illinois Community College Board. Plans are to include presentations to high schools served by Community College District 525, the Three Rivers Manufacturing Association, the Three Rivers Chapter of the American Society of Safety Engineers, Joliet Regional Chamber of Commerce and Industry as well as the presentation be offered as part of the college's Speakers Bureau.

Objective IV - Prepare a final report to IOE/DAVTE

This report reflects the completion of this objective and project.

PROBLEMS ENCOUNTERED

Two obstacles were encountered through the project that resulted in some departure from the original project plan. The original plan had called for the development of a Certificate for Industrial Hygiene Technologist as well as an Associate Degree model. The Certificate was not developed in this area on the recommendation of the industrial hygiene consultant. It was felt that the necessary skills to achieve the competencies as a I.H. technician as defined by the American Association of Industrial Hygiene could not be accomplished within the credit hours restriction imposed by a certificate program.

The project had as an additional objective the endorsement of the proposed Industrial Hygiene Technology Model by the American Board of Industrial Hygiene. This could not be accomplished due to the present

activity of the Board in attempting to establish guidelines for IHT program accreditation. Although this specific goal could not be reached, the Consultant's Report as previously mentioned with respect to Procedure 2.1, indicated the strong likelihood of the acceptability of this program when accreditation standards are finalized.

PUBLICITY ACTIVITIES

The industrial Hygiene Technology Program is to be featured in the college's media promotional activities for the Fall Semester 1980. See Attachment #9 for the format of the media news release.

RESOURCE PERSONS

The following named persons who represent the JJC Occupational Safety Advisory Committee aided in the ongoing review and evaluation of this project:

Joseph Drick
Safety Supervisor
Northern Petro Chemical
Box 459
Morris, IL 60450
(815-942-7011)

Joseph Kasiak
Safety Supervisor
Armak Company
Morris, IL 60450
(815-722-2618)

Chris Sorg
Director of Safety
Texaco Refinery
West Second Street
Lockport, IL 60441
(815-838-0770)

Cynthia Weaver
OSHA Representative
OSHA Technical Support Div.
230 S. Dearborn
Chicago, IL 60604
(312-353-2215)

John McGrath
Safety Supervisor
General Electric Company
Morris Operation
Route 1, Box 2193
Morris, IL 60450
(815-942-5590, Ext. 48)

Buck Reynolds
Safety Director
Caterpillar Tractor Company
Channahon Road
Joliet, IL 60436
(815-729-6288)

CONCLUSIONS AND RECOMMENDATIONS

The creation of an Industrial Hygiene Technology program at Joliet Junior College represents a joint venture in interdisciplinary cooperation between existing programs at the college. The necessity of creating a number of specialty courses was found not to be necessary due to the existing availability of the Environmental Control Technology curriculum at the college. Other colleges who seek to develop courses in the Industrial Hygiene area may find it necessary to develop specific specialty courses if their curricula lacks similar associated "sister" disciplines.

In choosing an industrial hygienist to consult in course and program development, institutions should look toward a generalist. Our survey response indicated a tendency on the part of highly specialized hygienists to overemphasize their particular area of specialty, e.e., noise, toxicology, biomechanics, within a proposed curriculum. If information developed from the American Academy Industrial Hygiene representative holds true, accreditation standards for two-year Associate Degree programs will reflect the generalist approach.

An internship experience was identified by survey results and our consultant's recommendation to be an important ingredient in a total curriculum for Industrial Hygiene Technology. The internship course (OCS 210) presently within the Occupational Safety program adequately fits the requirements for this exposure with the added development of specific industrial hygiene placements under the supervision of a bonifide industrial hygienist. The Chicago Chapter of the American Industrial Hygiene Association indicated an interest in assisting in the identification of suitable work stations for intern technicians.

In developing a curriculum in Industrial Hygiene, interested institutions may care to keep the following goals in mind that served to be a focal point for this project.

1. Provide adequate academic credentials and skills to enhance immediate employment in the field.
2. Provide sufficient academic background to support the student's preparation for IHT Certification by the American Board of Industrial Hygiene.
3. Provide a sound academic foundation from which to continue professional development.

LIST OF ATTACHMENTS

Attachment #1 - List of Schools Surveyed with Technical Programs in Industrial Hygiene Technology

Attachment #2 - Survey Instrument Ranking Proposed Courses in an Industrial Hygiene Technology Curriculum

Attachment #3 - List of Industrial Hygiene Consultants Surveyed

Attachment #4 - Survey Results Ranking Proposed Courses

Attachment #5 - Consultant's Report

Attachment #5A - Course Outline - OCS 105 Industrial Hygiene I

Attachment #5B - Course Outline - OCS 106 Industrial Hygiene II

Attachment #6 - Letter, dated March 12, 1980, American Academy of Industrial Hygiene

Attachment #7 - Industrial Hygiene Technology Brochure

Attachment #8 - Occupational Safety and Health Program Brochure

Attachment #9 - Fall Semester Publicity Release, Occupational Safety and Health Program

ATTACHMENT # 1

Education Opportunities In

INDUSTRIAL HYGIENE

The following are known to offer assorted courses or a two-year certificate program in industrial hygiene technician training. The list was made available from William J. Weis III, Manpower Officer, National Institute for Occupational Safety and Health, 4676 Columbia Parkway, Cincinnati, Ohio 45226.

Technician Programs

Berkeley-Charleston-Dorchester Technical Education Center
P.O. Box 10367
North Charleston, NC 29411

Chattanooga State Technical Institute
Chattanooga, TN 37406

Chesterfield-Marlboro Technical Education Center
Cheraw, SC 29520

Clark County Community College
Las Vegas, NV 89114

Cleveland County Technical Institute
Shelby, NC 28150

Delgado College
New Orleans, LA 70119

Detroit Institute of Technology
Detroit, MI 48201

Ferris State College
Big Rapids, MI 49307

Haskell Indian Junior College
P.O. Box 91
Lawrence, KS 66044

Manhattan College
Bronx, NY 10471

Merritt College
Oakland, CA 94619

Miami-Dade Community College
Miami, FL 33167

Midlands Technical Education Center
Columbia, SC 29250

Montgomery College
Takoma Park, MD 20012

Mt. Hood Community College
Gresham, OR 97030

Mt. San Antonio College
Walnut, CA 91789

North Shore Community College
Beverly, MA 01915

Northeastern Christian Junior College
Villanova, PA 19085

Northern Virginia Community College
Bailey's Crossroads, VA 22041

Oklahoma State University
Stillwater, OK 74074

Quincy College
Quincy, IL 62301

Rowan Technical Institute
Salisbury, NC 28144

Salem College
Salem, WV 26426

Southern Technical Institute
Marietta, GA 30060

Texas State Technical Institute
Waco, TX 76705

Thomas Nelson Community College
Hampton, VA 23366

Tri-County Technical Education Center
P.O. Box 87
Pendleton, SC 29670

University of New Haven
West Haven, CT 06516

Vincennes University
Vincennes, IN 47591

Western Wisconsin Technical Institute
LaCrosse, WI 54601

Williamsport Area Community College
Williamsport, PA 17701

ATTACHMENT# 2.

Joliet Junior College

1216 HOUBOLT AVENUE • JOLIET, ILLINOIS 60436 (815) 729-9020

Joliet Junior College is investigating the feasibility of establishing a curriculum for a certificate and two-year degree program in Industrial Hygiene Technology. The goal of our program will be to prepare a graduate who could enter industry and work under the supervision and direction of an industrial hygienist. This person would have minimum capabilities, as defined by the American Board of Industrial Hygiene, to adequately function as an industrial hygiene technologist.

> ***Industrial Hygiene Technologist Certification***
>
> In 1976 The American Board of Industrial Hygiene, in recognition of the growing group of technologists engaged in industrial hygiene activities, established an Industrial Hygiene Technologist Certification Program.
>
> "An Industrial Hygiene Technologist is a person who, by virtue of special studies and training, has acquired proficiency in an aspect or phase of industrial hygiene, e.g., air sampling, monitoring, instrumentation, specialized investigations or specialized laboratory procedures, and who performs such duties under the supervision of an industrial hygienist."
>
> *(Adopted October, 1975, by the American Board of Industrial Hygiene)*

You are one of 100 safety professionals we are in correspondence with and value your established experience in this area. I would like to solicit your cooperation and some of your valuable time to assist us in surveying specific course content for this program.

Enclosed you will find a list of courses and descriptions that represent existing courses in our college's Safety, Science, Math and Environmental Control Technology programs. Would you please indicate for each course your preference within a proposed curriculum for Industrial Hygiene Technologists. Check the appropriate column as to whether you feel the course is ESSENTIAL, DESIRABLE, or NOT NEEDED as part of the curriculum.

Please keep in mind, however, that any program will more than likely be limited to 40-45 credit hours of specialty courses. This is necessary in order to provide allowances for general education course requirements.

In addition, please feel free to add the name of any course you feel should be included as a part of the program. Briefly outline content by providing a general description.

Thank you in advance for cooperating with us on this project. Enclosed you will find a stamped, self-addressed envelope that you may use for your response.

Sincerely,

Don Ernst
Coordinator
Occupational Safety Program

DE/ph
Enc.

SURVEY FORM -- INDUSTRIAL HYGIENE TECHNOLOGIST COURSES

Below you will find a list of courses and descriptions that represent existing courses in Joliet Junior College's Safety, Science, Math and Environmental Control Technology programs. Would you please indicate for each course your preference within a proposed curriculum for Industrial Hygiene Technologists. Check the appropriate column as to whether you feel a course is ESSENTIAL, DESIRABLE, or NOT NEEDED as part of an IHT curriculum.

ESSENTIAL	DESIRABLE	NOT NEEDED	LIST OF COURSES AND DESCRIPTIONS
			OCCUPATIONAL SAFETY
			OCS 101 Introduction to Safety and Accident Prevention 3-0-3 Defines, applies, and evaluates a systematic approach in accident analysis directed at discovering and eliminating accident causal factors. The course will trace the development of the safety movement and identify safety problems typical in industry, business, government, transportation and emergency preparedness. The student will also be introduced to the literature in the field.
			OCS 102 Legal Aspects of Accident Prevention 3-0-3 A review of federal and state laws and judicial interpretations having application to industry, business and government safety programs including tort liability, insurance, workmen's compensation, and employer responsibility.
			OCS 103 Organization and Management of Safety Programs 3-0-3 A study of safety and accident prevention programs at private enterprise and governmental levels including the administrative, instructional, and protective aspects of a comprehensive safety program, preparation for supervisory positions. Prerequisite: Occupational Safety 101.
			OCS 104 Emergency and Disaster Preparedness 3-0-3 Management's responsibility of physical protection and the functions and responsibilities of staff during major emergencies, tornado, fire, hurricane, earthquake, nuclear accident, riot, and accidental injuries. Emphasis on functional and tested operational emergency plans with community coordination.
			OCS 105 Industrial Hygiene 3-0-3 To introduce the student to the problem of organic or systematic damage to the human organism as a result of inhalation, ingestion of or coming in contact with toxic dusts, fumes, gases, mists, vapors, or exposure to radiation, noise, vibration, and thermal stress. Emphasis is also placed on the modern methods in the prevention and control of these conditions.
			OCS 210 Internship in Occupational Safety 0-15-3 A field experience to enable the safety student to gain insight into the operational, administrative and supervisory responsibilities of a safety unit within business, industry or government. The student will be under the supervision of the instructor and an official
			BIOLOGY
			BIO 100 Medical Terminology 3-0-3 A basic course on the language of the world of medicine to simplify and expedite the education of the medical, dental, veterinary and nursing student, physical therapist, x-ray technician, medical records librarian and other hospital and clinic employees. Instruction is both lecture and audio-tutorial, and includes background lectures on anatomy and physiology tapes on medical history, word pronunciation and word drilling.
			BIO 101 General Biology 3-4-5 This course is especially designed to survey the basic principles of general biology, covered by the audio-tutorial method. Topics include cellular structure and physiology, growth and repair, reproduction and development, sources of energy, inheritance and man's interrelationship with his environment.

ESSEN-TIAL	DESIR-ABLE	NOT NEEDED	LIST OF COURSES AND DESCRIPTIONS
			BIO 102 General Biology 3-4-5 An introduction to the basic principles and concepts of modern biology. Included are molecular biology, genetics, evolution, ecology and some natural history. Stressed throughout are the interrelationships of plants and animals to man.
			BIO 130 Human Anatomy and Physiology 4-2-5 A comprehensive introduction to the structure and function of all organs and organ systems of the human body. Anatomical and physiological experiments are included in the laboratory portion of the course. Practical for all students in medical and paramedical science fields desiring a knowledge of the human body.
			BIO 140 Microbiology 3-2-4 A survey of the morphology, physiology, classification and culture of bacteria and related organisms of medical importance. The fundamentals of immunology, hygiene and sanitation are emphasized. Lectures and laboratory. Prerequisite: Biology 101 or permission of instructor.
			HEALTH **HEAL 106 Human Physiology 2-2-3** A continuation of Biology 130. Emphasizes the function of the human body including basic cell activities, homeostasis and control systems and the application of basic chemistry and physics to the coordination of body systems. Prerequisite: Biology 130.
			MATH **MATH 121 Technical Mathematics 3-0-3** A course including the topics of mathematics beyond high school geometry needed in the development of subjects covered in the technical curriculum. Prerequisite: Successful completion of elementary algebra and elementary geometry.
			MATH 122 Technical Mathematics 3-0-3 A course including the topics of intermediate mathematics needed in the development of subjects covered in the technical curriculum. Topics covered are logarithms, right triangles, vectors, trigonometry, trigonometric solutions of triangles, other applications of trigonometry, solving trigonometric equations and graphs of trigonometric functions. Prerequisite: Mathematics 121.
			MATH 131 College Algebra 4-0-4 A review and expansion of the topics of preceding algebra courses and the introduction and development of complex numbers, progressions, binomial theorem, mathematical induction and determinants. Prerequisite: Successful completion of elementary algebra.
			MATH 133 Finite Mathematics 4-0-4 This course is a prerequisite for Math 150. It covers the topics usually taught in college algebra excluding theory of equation, sequences and series, and mathematical induction. In addition, it includes topics in vectors, set theory, Boolean algebra, linear programming and mathematical modeling. Prerequisite: Successful completion of elementary algebra and intermediate algebra.
			MATH 135 Plane Trigonometry 3-0-3 Introductory course to trigonometric functions, solutions of triangles, inverse trigonometric functions, roots of complex numbers, trigonometric equations, trigonometric identities, radian measure and other basic topics. Prerequisite: Successful completion of elementary algebra, elementary geometry and intermediate algebra.
			MATH 145 Analytic Geometry 5-0-5 Includes a thorough study of plane analytic geometry and those topics of solid analytic geometry needed in the study of calculus. Prerequisite: Mathematics 135, or equivalent and Math 131 or equivalent.
			MATH 160 Calculus 5-0-5 Includes all work on differentiation usually given in a first year calculus course except for partial differentiation. It also includes integrating by the power formula and the application of single integrals to find areas, volumes and surfaces of revolutions, centroids, moment of inertia, work and total force. Prerequisite: Math 145 or equivalent.

ESSEN-TIAL	DESIR-ABLE	NOT NEEDED	LIST OF COURSES AND DESCRIPTIONS
			MATH 161 Calculus 3-0-3 Continuation of Mathematics 160. Includes a complete study of the techniques of integration. It also includes partial differentiation and multi-integrals with applications. A rigorous study of series including differentiation and integration of power series is given. Prerequisite: Math 160.
			MATH 210 Linear Algebra 3-0-3 A course covering matrices, their properties, operations and applications with emphasis on systems of linear equations; vector spaces, linear independence and bases of vector spaces, linear transformations, kernels and ranges, determinants, their properties and applications; eigenvalues and eigenvectors, the standard inner product on R3, the Gram-Schmidt process, diagonalization of symmetric matrices and real quadratic forms. Prerequisite: Math 161 or equivalent.
			MATH 220 Differential Equations and Orthogonal Functions 3-0-3 Includes first-order and simple higher-order ordinary differential equations with applications, linear differential equations with constant coefficients and their applications, simultaneous differential equations with applications, solution of differential equations, boundary value problems and Fourier Series. Prerequisite: Math 161 or equivalent.
			PHYSICS **PHYS 101 General Physics I 4-3-5** An introduction to the central ideas, principles and relationships of matter and energy. These are applied to the phenomena of our environment through lectures, demonstrations and laboratory exercises. Topics normally covered are motion, gravitation, friction, work, energy, power, momentum, rotation, oscillatory motion, states of matter and heat. Prerequisite: Trigonometry or concurrent enrollment in Math 135. Fall, Summer.
			PHYS 102 General Physics II 4-3-5 A continuation of Physics 101. Topics normally covered are waves, sound, light, electricity, magnetism, relativity, nuclear atoms, nucleus and radioactivity. Prerequisite: Physics 101. Spring, Summer.
			PHYS 103 Technical Physics I 3-2-4 An introduction to the basic concepts of physics with an emphasis on applications to modern technology. The major topics are mechanics and heat. Designed for students in career education, particularly the technical programs. It is recommended that students take Math 121-122. Prerequisite: Math 090 or equivalent. Fall
			PHYS 104 Technical Physics II 3-2-4 A continuation of Physics 103. The major topics are electricity, magnetism optics and sound. Prerequisite: Physics 103. Spring
			PHYS 201 Engineering Physics I 4-3-5 Statics, dynamics, sound, wave phenomena, and heat presented at the level of Halliday and Resnick. Normally required for physics, chemistry, math, physical sciences and engineering majors. Prerequisites: Credit or concurrent enrollment in Math 160. Spring
			PHYS 202 Engineering Physics II 4-3-5 Electricity, magnetism, optics. Continuation of Physics 201. Prerequisites: Physics 201 and credit or concurrent enrollment in Math 161. Fall.
			PHYS 203 Engineering Physics III 3-0-3 Relativity, quantum effects, atomic structure, nuclear structure, nuclear reactions, elementary particles, and the solid state. Prerequisite: Physics 202. Spring, Summer.
			PHYSICAL SCIENCE **PH SCI 120 Physical Science 3-2-4** An introduction to physical science including elements in physics, chemistry, geology, astronomy and meteorology. This discussion and activity-oriented laboratory course assumes no previous work in science or mathematics. The course will satisfy four hours of a laboratory science requirement. Prerequisite: None. Fall, Spring, Summer.

ESSEN-TIAL	DESIR-ABLE	NOT NEEDED	LIST OF COURSES AND DESCRIPTIONS
			CHEMISTRY
			CHEM 100 General Chemistry 4-3-5 A one-semester course of selected topics in general chemistry as general education or for students in agriculture, nursing, and home economics. May be followed by Chemistry 108. A student may not receive credit for both Chemistry 100 and Chemistry 101. Fall, Spring, Summer.
			CHEM 101 General Chemistry 4-3-5 The following topics are discussed: atomic theory and structure, bonding, nomenclature, stoichiometry, phases of matter and solutions. The laboratory complements these topics. A student may not receive credit for both Chemistry 100 and Chemistry 101. Prerequisite: One year of high school algebra or Math 094. Fall, Spring, Summer.
			CHEM 102 General Chemistry 4-3-5 This is the second semester of a year sequence in General Chemistry. The topics discussed are colloids, thermodynamics, kinetics, equilibrium, electro-chemistry, coordination compounds and nuclear chemistry. The laboratory complements these topics. Prerequisite: Chemistry 101 or written consent of the department chairman. Fall, Spring, Summer.
			CHEM 101a General Chemistry and Qualitative Analysis 3-4-5 Review of fundamental principles, with emphasis on calculations, bonding, solutions, and oxidation-reduction. Laboratory emphasis: Data-collection and laboratory skills. Prerequisite: High school chemistry with a minimum grade of B. A student who does not meet these criteria but desires admission to the course may request examinations in chemistry and mathematics by consultation with the instructor or the department chairman. Fall.
			CHEM 102a General Chemistry and Qualitative Analysis 3-4-5 Principles of equilibrium, thermochemistry, and chemistry of the metals and nonmetals including their coordination compounds. Laboratory includes qualitative analysis of inorganic materials. Prerequisite: Chemistry 101a or minimum grade of B in Chemistry 101 with recommendation of instructor. Spring.
			CHEM 105 Quantitative Analysis 2-6-5 Gravimetric analysis, volumetric analysis, electrolytic analysis, spectrophotometric analysis, spectroscopic analysis and gas chromatography. Prerequisite: Chemistry 102a. Summer.
			CHEM 108 Elementary Organic Chemistry 3-2-4 A one-semester course with laboratory for students in agriculture, forestry, home economics and nursing curricula. A study of molecular structure, functional groups, nomenclature, representative preparations and reactions. Applications to fuels, foods, medicines and synthetic fibers. Prerequisite: Chemistry 100 or Chemistry 101. Fall, Spring, Summer.
			CHEM 209 Organic Chemistry 4-3-5 Study of alkanes, alkenes, alkynes, cyclic hydrocarbons, aromatic hydrocarbons, alkylhalides, alcohols, nomenclature and their reactions. Spectroscopy-infra-red, ultra-violet, nuclear magnetic resonance, gas chromatography, optical activity and conformational analysis. Prerequisite: Chemistry 102 or 102a. Fall.
			CHEM 210 Organic Chemistry 4-3-5 Continuation of Chemistry 209. Study of organic acids, aldehydes, ketones, carbanions, phenols, amines, diazonium salts. Condensation reactions, heterocylic compounds, polymerization reactions, carbohydrates, fats and proteins. Prerequisite: Chemistry 209. Spring.
			ENVIRONMENTAL CONTROL TECHNOLOGY
			ECT 101 Intro. to Environmental Technology 3-0-3 Fundamentals of air and water pollution technology, including sources of pollution, measurement of pollution and environmental quality, government regulations, and basic pollution control technologies. Prerequisite: None.
			ECT 105 Microbiology of Aquatic Systems 2-4-4 Introduction of basic laboratory equipment, instruments and glassware that are used in environmental analysis. Microbiological sampling and analysis will be stressed as well as data collection, interpretation and report writing. Membrane filtration techniques, BOD and DO are included. Prerequisite: ECT 101.

ESSEN-TIAL	DESIR-ABLE	NOT NEEDED	LIST OF COURSES AND DESCRIPTIONS
			ECT 106 Water and Wastewater Analysis 2-3-3 Analytical techniques for various environmental analyses will be discussed and carried out in the laboratory. The procedures for sampling, analyzing, interpreting and reporting results will be discussed. Analyses will include BOD, DO, COD, gravimetric, nutrients, titrimetric and complexiometric procedures. Prerequisite: Chem 100, Math 121 recommended
			ECT 107 Wastewater Analysis 2-3-3 Standard analytical procedures for measuring water quality and efficiencies of water and wastewater treatment processes. Course covers both theoretical and applied aspects of standard method for analysis. Prerequisite: ECT 106
			ECT 108 Advanced Techniques in Environmental Analysis 2-4-4 Principles and applications of advanced techniques in analytical chemistry appropriate to environmental surveillance and control. Includes pesticide analysis, trace metals identification and organics that have been introduced from industrial commercial sources. Prerequisite: ECT 107, Chem 108 recommended
			ECT 110 Instrumentation 2-2-3 Fundamentals of chemical instrumental analysis, including sampling, standardization and calibration techniques. Interpretation and application of electrical, optical and thermal measurements in instrumental analysis as applied to environmental analysis. Prerequisite: Chem 100, Math 121, 122 recommended
			ECT 111 Laboratory Limnological Principle 2-3-3 Describes methods and procedures necessary to design and implement a monitoring and surveillance program including sampling, collecting and interpreting data for corrective action and the filing of required reports. Also includes maintenance of laboratory inventories of supplies and equipment, training techniques and the handling of visitors. Prerequisite: ECT 101
			ECT 112 Environmental Biology 3-0-3 A course designed to describe and analyze the biologic and health effects on man and his environment caused by man induced pollution. Includes an overview of basic ecologic principles. Prerequisite: ECT 101
			ECT 120 Ambient Air Sampling and Analysis 2-4-4 Principles and practice of ambient air sampling; ambient survey sampling methods and analytical techniques applied to particulate and gaseous pollutants. Prerequisite: None
			ECT 121 Introduction to Source Sampling and Analysis 2-4-4 Review of ambient sampling. Gas laws and psychometry; methods of determination of gas velocity and flow rate. Equipment and preparations necessary for source sampling for particulates. Prerequisite: ECT 120
			ECT 122 Advanced Source Sampling and Analysis 2-4-4 Review of particulate sampling methods. Study of gaseous sampling techniques. Analysis for specific gaseous pollutants. Prerequisite: ECT 121, Phys 103
			ECT 123 Sources of Air Pollution 3-0-3 Familiarization of the major industrial processes with respect to raw materials, processing methods and equipment as they relate to types and quantities of air pollutants. Methodology of source emission inventories. Prerequisite: ECT 101
			ECT 124 Air Pollution Instrumentation 2-4-4 Fundamentals of measurement and errors, measurement of gas temperature, pressure flow, integrated measurement systems, specialized air pollution sampling equipment, analytical instrumentation, microscopy. Emphasis on instrument use, calibration and limits of accuracy. Prerequisite: ECT 120, Phys 104
			ECT 125 Air Pollution Control 3-4-5 Objectives and methods of air pollution control. Control equipment classes studied include mechanical collectors, filtration devices, wet collectors, electrostatic precipitators, gas absorption, adsorption and incineration. Also, equipment testing to evaluate performance of control equipment and field trips to observe practical use of control equipment. Prerequisite: ECT 101

ATTACHMENT # 3.

INDUSTRIAL HYGIENE CONSULTANTS . . .

AMERICAN INDUSTRIAL HYGIENE ASSOCIATION 475 Wolf Ledges Parkway, Akron, Ohio, 44311

industrial hygiene consultants . . .

The following listed consultants, all of whom are members of the American Industrial Hygiene Association, state that they are available for consulting services in industrial hygiene. The specific specialties applicable to each are identified by the code numbers shown in bold type at the end of the listings. For convenience in relating available consultants to a specific area, main listings are geographical, followed by an alphabetical cross-reference. The American Industrial Hygiene Association provides these listings as an informational service, accepting no responsibility for the performance of the consultants listed and making no representation regarding their competence as consultants.

CONSULTANT'S SPECIALTY	CODE NO.	CONSULTANT'S SPECIALTY	CODE NO.	CONSULTANT'S SPECIALTY	CODE NO.
Air pollution	1	Industrial hygiene chemistry	5A	Safety specialist	11
Audiometry	2	Meteorology	6	Toxicology	12
Biological monitoring	3	Noise control	7	Training instruction	13
Ergonomics	4	Occupational medicine	8	Ventilation	14
Industrial Hygiene—Comprehensive plant studies and/or analyses	5	Product safety—labeling	9	Waste disposal	15
		Radiological control	10	Water pollution	16
		Respirator protection	10A		

ALABAMA

* **Rose, Vernon E., D.P.H.**
Department of Public Health
School of Medicine
University of Alabama in Birmingham
Birmingham, AL 35294
(205) 934-2487
5,13

ARIZONA

* **Ahearn, William C.**
Ahearn & Associates
5603 N Calle Del Santo
Phoenix, AZ 85018
(602) 959-9446
5

* **Jackson, James O., Ph.D.**
University of Arizona
1435 North Fremont
Tucson, AZ 85719
(602) 626-7345

CALIFORNIA

* **Allan, Ralph E.**
Department of Community & Environmental Medicine
College of Medicine
University of California
Irvine, CA 92664
(5)

* **Blum, Dwain E., Ph.D.**
11 Senior Avenue
Berkeley, CA 94708
(415) 548-6516
5,13,14

* **Boston, Lester E.**
8961 Ann Cross Drive
Garden Grove, CA 92641
(714) 530-4259
5,7,10A,11,13,14,15

Cohen, Kenneth S., Ph.D., P.E.
Consulting HEALTH Services
P.O. Box 1625
El Cajon, CA 92022
(714) 579-6233
3,5,8,9,11,12,13,14

* **Cooper, W. Clark, M.D.**
2150 Shattuck Ave. #401
Berkeley, CA 94704
(415) 845-3355
3,5,8,12

Dickerson, O. Bruce, M.D., M.P.H.
Occuguard, Inc.
12360 Hilltop Drive
Los Altos, CA 94022
(415) 948-8837
2,3,4,8,11,12

* **Einert, Christine, M.D.**
629 Euclid Ave
Berkeley, CA 94708
(415) 524-5495
(8)

Falcon Customer Services, Inc.
Environmental Laboratory
3333 California St. (Annex)
San Francisco, CA 94119
(415) 929-2706
1,4,5,5A,7,10A,11,13,14

* **Felton, Theodore A.**
5985 Contra Costa Road
Oakland, CA 94618
(415) 547-3075
5,11,13

* **Kossack, William C., P.E.**
753 Cordilleras Avenue
San Carlos, CA 94070
(415) 591-6134
1,5,11,14,15,16

* **Noble, Wesley M.**
1823 Bayview Ave.
Belmont, CA 94002
(415) 592-4595
(5)

* **Null, David H., Ph.D.**
Dept. of Health, Science and Human Ecology
California State College
5500 State College Parkway
San Bernardino, CA 92407
(714) 887-7348
5,10A,12,13

* **Oberg, Maurice C., Sc.D.**
Certified Health Services
1772 Tulane Avenue
Richmond, CA 94805
(415) 233-0295
1,3,4,5,7,9,10,11,13,14,15,16

* **Port, Eugene A.**
Health Science Associates
10941 Bloomfield St., Suite B
Los Alamitos, CA 90720
(213) 430-1031
1,2,4,5,7,10,11,13,14,15

* **Rappaport, Stephen M., Ph.D.**
School of Public Health
University of California
Berkeley, CA 94720
(415) 642-7916
5,5A,13

* **Rogers, Jack C., P.E.**
5306 Lindley Ave
Encino, CA 91316
(213) 987-1405
5,7,9,10,11,13,14,15,16

* **Rosati, Guido J.**
3248 Tice Creek Dr., #4
Walnut Creek, CA 94595
(415) 935-6068
(5)

Rubin, Daniel F., M.D.
Suite 725 E
East Office Tower
Cedar Sinai Medical Office Towers
8631 West 3rd Street
Los Angeles, CA 90048
(213) 657-4981
3,8,9,12

* **Salazar, Alfredo, P.E.**
Senior Industrial Hygienist
SRI International
333 Ravenswood Ave
Menlo Park, CA 94025
(415) 326-6200 Ext. 3700
1,5,7,9,10,11,13,14

* **Salot, Stuart E., Ph.D.**
CTL Environmental Services

**Certified by American Board of Industrial Hygiene*

2905 E. Century Boulevard
South Gate, CA 90280
(213) 564-2641
1,3,5,5A,7,8,9,11,12,14,15,16

* **Spielman, Howard B.**
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10941 Bloomfield St.; Suite B
Los Alamitos, CA 90720
(213) 430-1031
1,2,4,5,5A,7,10,10A,11,13,14,15

* **Trommershausen, A.J.**
1609 Ptarmigan Drive 1B
Walnut Creek, CA 94595
(415) 932-4105
5,11

Yu, Kin
NATLSCO/Kemper
Loss Control Engineering Dept.
3545 Wilshire Boulevard
Los Angeles, CA 90010
(213) 487-6111
(5)

COLORADO

Beaulieu, Harry, Ph.D.
HJB Consultation
525 City Park Ave.
Ft. Collins, CO 80521
(303) 221-5672
5,7,11,13

Enbionics - A Metpath Company
1469 South Holly Street
Denver, CO 80222
(303) 758-0430
3,5,5A,9,12,13,14,16

Gerchman, Lois L., Ph.D.
Enbionics - A Metpath Company
1469 S. Holly Street
Denver, CO 80222
(303) 758-0430
3,5,5A,12,16

* **Hager, Robert N., Jr., Ph.D.**
Hager Laboratories, Inc.
12000 E. 47th Avenue
Denver, CO 80239
(303) 371-1441
1,3,5,11,12,13,14

Lewine, Janice F.
Colorado School of Mines
Research Institute
P.O. Box 112
Golden, CO 80401
(303) 279-2581
1,5,11,13,14,15,16,16,17

Teitelbaum, Daniel T., M.D.
The Center for Toxicology, Man and
Environment, Inc.
6825 East Tennessee Avenue
Suite 365
Denver, CO 8022*
(303) 399 2700
3,5,8,9,10A,12,13

Wingeleth, Dale C., Ph.D.
Wingeleth, Dale C. Ph.D., Inc.
5401 Western Ave.
Boulder, CO 80301
(303) 494-4242
1,3,5,5A,9,12,16

CONNECTICUT

Aetna Technical Services, Inc.
(One of the Aetna Life and
Casualty Companies)
151 Farmington Avenue
Hartford, CT 06115
(203) 273-3298
1,4,5,7,8,9,10,11,13,
14,15,16

Springborn Laboratories, Inc.
Water Street
Enfield, CT 06082
(203) 749-8371
3,4,5,7,9,11,13,14

DELAWARE

* **Hill, Vaughn H.**
Noise Reduction, Inc.
607 Orchard Drive
Wilmington, DE 19803
(302) 478-1151

DISTRICT OF COLUMBIA

* **Doyle, Henry N.**
5303 Augusta St.
Washington, D.C. 20016
(301) 229-1277
5,13

Landry, Edward B., C.S.P., P.E.
12 Kentbury Way, Bethesda
Washington, D.C. 20014
(301) 654-4422
9,11,13

FLORIDA

* **Deichmann, William B., Ph.D.**
M.D. (Honorary)
Prof. of Pharmacology Emeritus
8640 N.E. Second Avenue
Miami, FL 33158
(305) 751-8150
1,8,12,16

Environmental Science &
Engineering, Inc.
P. O. Box 13454
Gainesville, FL 32604
(904) 372-3318
1,3,5,7,10,14,15,16

* **McKichan, John C.**
859 E. Jeffery St.
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(305) 392-0787
4,7,14

* **Nifong, Gordon D., Ph.D.**
Industrial Hygiene & Environmental
Services, Inc.
126 Arietta Shores Dr.
Auburndale, FL 33823
(813) 967-6889
1,5,5A,9,10A,13,14,16

* **Sobol, Oscar J.**
Century Village West
Cornwall B, #4025
Boca Raton, FL 33432
5,7,11

Webber, Alonzo M.
928 Xanadu Ave., W.
Venice, FL
(813) 485-4328
2,5,7,14

* **Whitman, Newton E.**
Industrial Hygiene & Environmental
Services, Inc.
1640 South Ocean Shore Blvd.
Flagler Beach, FL 32036
(904) 439-3216
3,5,5A,9,10A,13

GEORGIA

Clayton Environmental
Consultants, Inc.
3340 Peachtree Road, N.E.
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Atlanta, GA 30326
(404) 231-1770
1,3,5,5A,6,7,8,10,10A,11,12,13,14,
15,16

Stone, Raymond B.
NATLSCO/Kemper
1401 Peachtree St., NE
Atlanta, GA 30309
(404) 892-1330
(5)

HAWAII

* **Hartlein III, Fred, FAIC, PC-A**
CSP, CHCM
The Industrial Analytical Laboratory
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A. F. Meyer and Associates, Inc. ... LA, VA
Miller, Robert W. ... IL
Moisan, Raymond, Eng., M.P.H. ... Canada

NNNNNNNNNNNNNNNNNN

National Loss Control Service Corp. ... IL
Nelson, Arthur ... PA
Nelson, James H., Ph.D. ... UT
Neukrickatz, Ernest ... MA
Nilsing, Gordon D., Ph.D. ... FL
Noble, Wesley M. ... CA
Null, David H., Ph.D. ... CA

OOOOOOOOOOOOOOOOOO

Oberg, Maurice C., Sc.D. ... CA
Occusafe, Inc. ... IL

Oglesby, Frank L ..... TN
Ostergaard, Paul B ..... NJ

PPPPPPPPPPPPPPPPPPPPPP

Padden, David A ..... MI
Peterson, Jack E., P.E., Ph.D ..... WI
Port, Eli A IL
Port, Eugene A ..... CA

RRRRRRRRRRRRRRRRRR

Rappaport, Stephen M., Ph.D ..... CA
Research Triangle Institute ..... NC
Rogers, Jack C., P.E ..... CA
Rosati, Guido J ..... CA
Rose, Vernon E., Ph.D ..... AL
Ross, John E ..... OH
Rubin, Daniel F., M.D ..... CA

SSSSSSSSSSSSSSSSSSS

Salazar, Alfredo, P.E ..... CA
Salot, Stuart E., Ph.D ..... CA
Scott, William D., EIT, IHT ..... WA
Seifert, Harry E., P.E ..... SC
Slack, Donald J ..... KY
Smith, Ralph G., Ph.D ..... MI
Sobol, Oscar J ..... FL
Solook, John T ..... MA
Soule, Robert D ..... PA
Spielman, Howard B ..... CA
Springborn Laboratories, Inc. ..... CT
Stanton, George B., Jr., P.E., C.S.P., F.R.S.H ..... NJ
Stevens, Charles H., P.E ..... MD, PA
Stewart, Albert E., CSP ..... MO
Stoddard, David L ..... TN
Stone, Raymond B ..... GA
Swanson, Jon R., Ph.D ..... MI
Symmes, Maini & McKee, Inc. ..... MA

TTTTTTTTTTTTTTTTTTTTTT

Taylor, Henry M., Jr. ..... VA
Teitelbaum, Daniel T., M.D. ..... CO
Toca, Frederick M., Ph.D ..... MA
Todd, Alan S ..... PA
Trommershausen, A.J. ..... CA

VVVVVVVVVVVVVVVVVVVV

Vandervort, Robert ..... UT

WWWWWWWWWWWWWW

Wanta, Raymond C ..... MA
Webber, Alonzo M ..... FL
White, Otto, Jr. ..... NY
Whitman, Newton E ..... FL
Willson, Robert D ..... OH
Wilson, George L ..... OH
Wingeleth, Dale C., Ph.D ..... CO
Wrenn, McDonald E., Ph.D. ..... UT
Wright, Usha, C.S.P. ..... NJ

YYYYYYYYYYYYYYYYYYYY

Yu, Kin ..... CA

ATTACHMENT # 4.

SURVEY FORM -- INDUSTRIAL HYGIENE TECHNOLOGIST COURSES

Below you will find a list of courses and descriptions that represent existing courses in Joliet Junior College's Safety, Science, Math and Environmental Control Technology programs. Would you please indicate for each course your preference within a proposed curriculum for Industrial Hygiene Technologists. Check the appropriate column as to whether you feel a course is ESSENTIAL, DESIRABLE, or NOT NEEDED as part of an IHT curriculum.

ESSENTIAL	DESIRABLE	NOT NEEDED	LIST OF COURSES AND DESCRIPTIONS
			OCCUPATIONAL SAFETY
36	26	10	**OCS 101 Introduction to Safety and Accident Prevention 3-0-3** Defines, applies, and evaluates a systematic approach in accident analysis directed at discovering and eliminating accident causal factors. The course will trace the development of the safety movement and identify safety problems typical in industry, business, government, transportation and emergency preparedness. The student will also be introduced to the literature in the field.
15	33	24	**OCS 102 Legal Aspects of Accident Prevention 3-0-3** A review of federal and state laws and judicial interpretations having application to industry, business and government safety programs including tort liability, insurance, workmen's compensation, and employer responsibility.
9	33	30	**OCS 103 Organization and Management of Safety Programs 3-0-3** A study of safety and accident prevention programs at private enterprise and governmental levels including the administrative, instructional, and protective aspects of a comprehensive safety program, preparation for supervisory positions. Prerequisite: Occupational Safety 101.
5	22	45	**OCS 104 Emergency and Disaster Preparedness 3-0-3** Management's responsibility of physical protection and the functions and responsibilities of staff during major emergencies, tornado, fire, hurricane, earthquake, nuclear accident, riot, and accidental injuries. Emphasis on functional and tested operational emergency plans with community coordination.
71	1	0	**OCS 105 Industrial Hygiene 3-0-3** To introduce the student to the problem of organic or systematic damage to the human organism as a result of inhalation, ingestion of or coming in contact with toxic dusts, fumes, gases, mists, vapors, or exposure to radiation, noise, vibration, and thermal stress. Emphasis is also placed on the modern methods in the prevention and control of these conditions.
27	22	23	**OCS 210 Internship in Occupational Safety 0-15-3** A field experience to enable the safety student to gain insight into the operational, administrative and supervisory responsibilities of a safety unit within business, industry or government. The student will be under the supervision of the instructor and an official
			BIOLOGY
12	32	28	**BIO 100 Medical Terminology 3-0-3** A basic course on the language of the world of medicine to simplify and expedite the education of the medical, dental, veterinary and nursing student, physical therapist, x-ray technician, medical records librarian and other hospital and clinic employees. Instruction is both lecture and audio-tutorial, and includes background lectures on anatomy and physiology, tapes on medical history, word pronunciation and word drilling.
26	25	21	**BIO 101 General Biology 3-4-5** This course is especially designed to survey the basic principles of general biology, covered by the audio-tutorial method. Topics include cellular structure and physiology, growth and repair, reproduction and development, sources of energy, inheritance and man's interrelationship with his environment.

ESSEN-TIAL	DESIR-ABLE	NOT NEEDED	LIST OF COURSES AND DESCRIPTIONS
7	24	41	**BIO 102 General Biology 3-4-5** An introduction to the basic principles and concepts of modern biology. Included are molecular biology, genetics, evolution, ecology and some natural history. Stressed throughout are the interrelationships of plants and animals to man.
35	22	16	**BIO 130 Human Anatomy and Physiology 4-2-5** A comprehensive introduction to the structure and function of all organs and organ systems of the human body. Anatomical and physiological experiments are included in the laboratory portion of the course. Practical for all students in medical and paramedical science fields desiring a knowledge of the human body.
1	23	48	**BIO 140 Microbiology 3-2-4** A survey of the morphology, physiology, classification and culture of bacteria and related organisms of medical importance. The fundamentals of immunology, hygiene and sanitation are emphasized. Lectures and laboratory. Prerequisite: Biology 101 or permission of instructor.
18	29	25	**HEALTH** **HEAL 106 Human Physiology 2-2-3** A continuation of Biology 130. Emphasizes the function of the human body including basic cell activities, homeostasis and control systems and the application of basic chemistry and physics to the coordination of body systems. Prerequisite: Biology 130
47	14	11	**MATH** **MATH 121 Technical Mathematics 3-0-3** A course including the topics of mathematics beyond high school geometry needed in the development of subjects covered in the technical curriculum. Prerequisite: Successful completion of elementary algebra and elementary geometry.
35	25	12	**MATH 122 Technical Mathematics 3-0-3** A course including the topics of intermediate mathematics needed in the development of subjects covered in the technical curriculum. Topics covered are logarithms, right triangles, vectors, trigonometry, trigonometric solutions of triangles, other applications of trigonometry, solving trigonometric equations and graphs of trigonometric functions. Prerequisite: Mathematics 121.
20	27	25	**MATH 131 College Algebra 4-0-4** A review and expansion of the topics of preceding algebra courses and the introduction and development of complex numbers, progressions, binomial theorem, mathematical induction and determinants. Prerequisite: Successful completion of elementary algebra.
6	15	51	**MATH 133 Finite Mathematics 4-0-4** This course is a prerequisite for Math 150. It covers the topics usually taught in college algebra excluding theory of equation, sequences and series, and mathematical induction. In addition, it includes topics in vectors, set theory, Boolean algebra, linear programming and mathematical modeling. Prerequisite: Successful completion of elementary algebra and intermediate algebra.
8	18	46	**MATH 135 Plane Trigonometry 3-0-3** Introductory course to trigonometric functions, solutions of triangles, inverse trigonometric functions, roots of complex numbers, trigonometric equations, trigonometric identities, radian measure and other basic topics. Prerequisite: Successful completion of elementary algebra, elementary geometry and intermediate algebra.
6	17	48	**MATH 145 Analytic Geometry 5-0-5** Includes a thorough study of plane analytic geometry and those topics of solid analytic geometry needed in the study of calculus. Prerequisite: Mathematics 135, or equivalent and Math 131 or equivalent.
7	15	50	**MATH 160 Calculus 5-0-5** Includes all work on differentiation usually given in a first year calculus course except for partial differentiation. It also includes integrating by the power formula and the application of single integrals to find areas, volumes and surfaces of revolutions, centroids, moment of inertia, work and total force. Prerequisite: Math 145 or equivalent.

ESSEN-TIAL	DESIR-ABLE	NOT NEEDED	LIST OF COURSES AND DESCRIPTIONS
2	15	55	**MATH 161 Calculus 3-0-3** Continuation of Mathematics 160. Includes a complete study of the techniques of integration. It also includes partial differentiation and multi-integrals with applications. A rigorous study of series including differentiation and integration of power series is given. Prerequisite: Math 160.
1	7	64	**MATH 210 Linear Algebra 3-0-3** A course covering matrices, their properties, operations and applications with emphasis on systems of linear equations; vector spaces, linear independence and bases of vector spaces, linear transformations, kernels, and ranges; determinants, their properties and applications; eigenvalues and eigenvectors; the standard inner product on R3; the Gram-Schmidt process; diagonalization of symmetric matrices and real quadratic forms. Prerequisite: Math 161 or equivalent.
0	6	66	**MATH 220 Differential Equations and Orthogonal Functions 3-0-3** Includes first-order and simple higher order ordinary differential equations with applications, linear differential equations with constant coefficients and their applications, simultaneous differential equations with applications, solution of differential equations, boundary value problems and Fourier Series. Prerequisite: Math 161 or equivalent.
			PHYSICS
39	22	11	**PHYS 101 General Physics I 4-3-5** An introduction to the central ideas, principles and relationships of matter and energy. These are applied to the phenomena of our environment through lectures, demonstrations and laboratory exercises. Topics normally covered are motion, gravitation, friction, work, energy, power, momentum, rotation, oscillatory motion, states of matter and heat. Prerequisite: Trigonometry or concurrent enrollment in Math 135. Fall, Summer.
31	27	14	**PHYS 102 General Physics II 4-3-5** A continuation of Physics 101. Topics normally covered are waves, sound, light, electricity, magnetism, relativity, nuclear atoms, nucleus and radioactivity. Prerequisite: Physics 101. Spring, Summer.
26	22	24	**PHYS 103 Technical Physics I 3-2-4** An introduction to the basic concepts of physics with an emphasis on applications to modern technology. The major topics are mechanics and heat. Designed for students in career education, particularly the technical programs. It is recommended that students take Math 121-122. Prerequisite: Math 090 or equivalent. Fall.
24	22	26	**PHYS 104 Technical Physics II 3-2-4** A continuation of Physics 103. The major topics are electricity, magnetism, optics and sound. Prerequisite: Physics 103. Spring.
11	15	46	**PHYS 201 Engineering Physics I 4-3-5** Statics, dynamics, sound, wave phenomena, and heat presented at the level of Halliday and Resnick. Normally required for physics, chemistry, math, physical sciences and engineering majors. Prerequisites: Credit or concurrent enrollment in Math 160. Spring.
6	13	53	**PHYS 202 Engineering Physics II 4-3-5** Electricity, magnetism, optics. Continuation of Physics 201. Prerequisites: Physics 201 and credit or concurrent enrollment in Math 161. Fall.
5	11	56	**PHYS 203 Engineering Physics III 3-0-3** Relativity, quantum effects, atomic structure, nuclear structure, nuclear reactions, elementary particles, and the solid state. Prerequisite: Physics 202. Spring, Summer.
			PHYSICAL SCIENCE
11	15	46	**PH SCI 120 Physical Science 3-2-4** An introduction to physical science including elements in physics, chemistry, geology, astronomy and meteorology. This discussion and activity oriented laboratory course assumes no previous work in science or mathematics. The course will satisfy four hours of a laboratory science requirement. Prerequisite: None. Fall, Spring, Summer.

ESSEN-TIAL	DESIR-ABLE	NOT NEEDED	LIST OF COURSES AND DESCRIPTIONS
			CHEMISTRY
23	4	45	**CHEM 100 General Chemistry 4-3-5** A one-semester course of selected topics in general chemistry as general education or for students in agriculture, nursing, and home economics. May be followed by Chemistry 108. A student may not receive credit for both Chemistry 100 and Chemistry 101. Fall, Spring, Summer.
44	8	20	**CHEM 101 General Chemistry 4-3-5** The following topics are discussed: atomic theory and structure, bonding, nomenclature, stoichiometry, phases of matter and solutions. The laboratory complements these topics. A student may not receive credit for both Chemistry 100 and Chemistry 101. Prerequisite: One year of high school algebra or Math 094. Fall, Spring, Summer.
37	16	19	**CHEM 102 General Chemistry 4-3-5** This is the second semester of a year sequence in General Chemistry. The topics discussed are colloids, thermodynamics, kinetics, equilibrium, electro-chemistry, coordination compounds and nuclear chemistry. The laboratory complements these topics. Prerequisite: Chemistry 101 or written consent of the department chairman. Fall, Spring, Summer.
34	27	11	**CHEM 101a General Chemistry and Qualitative Analysis 3-4-5** Review of fundamental principles, with emphasis on calculations, bonding, solutions and oxidation-reduction. Laboratory emphasis: Data-collection and laboratory skills. Prerequisite: High school chemistry with a minimum grade of B. A student who does not meet these criteria but desires admission to the course may request examinations in chemistry and mathematics by consultation with the instructor or the department chairman. Fall.
31	25	16	**CHEM 102a General Chemistry and Qualitative Analysis 3-4-5** Principles of equilibrium, thermochemistry, and chemistry of the metals and nonmetals, including their coordination compounds. Laboratory includes qualitative analysis of inorganic materials. Prerequisite: Chemistry 101a or minimum grade of B in Chemistry 101 with recommendation of instructor. Spring.
34	25	13	**CHEM 105 Quantitative Analysis 2-6-5** Gravimetric analysis, volumetric analysis, electrolytic analysis, spectrophotometric analysis, spectroscopic analysis and gas chromatography. Prerequisite: Chemistry 102a. Summer.
26	11	35	**CHEM 108 Elementary Organic Chemistry 3-2-4** A one-semester course with laboratory for students in agriculture, forestry, home economics and nursing curricula. A study of molecular structure, functional groups, nomenclature, representative preparations and reactions. Applications to fuels, foods, medicines and synthetic fibers. Prerequisite: Chemistry 100 or Chemistry 101. Fall, Spring, Summer.
27	28	17	**CHEM 209 Organic Chemistry 4-3-5** Study of alkanes, alkenes, alkynes, cyclic hydrocarbons, aromatic hydrocarbons, alkylhalides, alcohols, nomenclature and their reactions. Spectroscopy-infra-red, ultra-violet, nuclear magnetic resonance, gas chromatography, optical activity and conformational analysis. Prerequisite: Chemistry 102 or 102a. Fall.
21	25	26	**CHEM 210 Organic Chemistry 4-3-5** Continuation of Chemistry 209. Study of organic acids, aldehydes, ketones, carbanions, phenols, amines, diazonium salts. Condensation reactions, heterocylic compounds, polymerization reactions, carbohydrates, fats and proteins. Prerequisite: Chemistry 209. Spring.
			ENVIRONMENTAL CONTROL TECHNOLOGY
45	15	12	**ECT 101 Intro. to Environmental Technology 3-0-3** Fundamentals of air and water pollution technology, including sources of pollution, measurement of pollution and environmental quality government regulations and basic pollution control technologies. Prerequisite: None.
4	14	54	**ECT 105 Microbiology of Aquatic Systems 2-4-4** Introduction of basic laboratory equipment, instruments and glassware that are used in environmental analysis. Microbiological sampling and analyses will be stressed as well as data collection, interpretation and report writing. Membrane filtration techniques, BOD and DO are included. Prerequisite: ECT 101.

ESSEN-TIAL	DESIR-ABLE	NOT NEEDED	LIST OF COURSES AND DESCRIPTIONS
9	27	35	**ECT 106 Water and Wastewater Analysis 2-3-3** Analytical techniques for various environmental analyses will be discussed and carried out in the laboratory. The procedures for sampling, analyzing, interpreting and reporting results will be discussed. Analyses will include BOD, DO, COD, gravametric, nutrients, titrimetric and complexometric procedures. Prerequisite: Chem 103, Math 121 recommended.
5	22	45	**ECT 107 Wastewater Analysis 2-3-3** Standard analytical procedures for measuring water quality and efficiencies of water and wastewater treatment processes. Course covers both theoretical and applied aspects of standard methods for analysis. Prerequisite: ECT 106
15	23	34	**ECT 108 Advanced Techniques in Environmental Analysis 2-4-4** Principles and applications of advanced techniques in analytical chemistry appropriate to environmental surveillance and control. Includes pesticide analysis, trace metals identification and organics that have been introduced from and other commercial sources. Prerequisite: ECT 107, Chem 108 recommended
51	14	7	**ECT 110 Instrumentation 2-2-3** Fundamentals of chemical instrumental analysis, including sampling, standardization and calibration techniques. Interpretation and application of electrical, optical and thermal measurements in instrumental analysis as applied to environmental analysis. Prerequisite: Chem 100, Math 121, 122 recommended
16	17	39	**ECT 111 Laboratory Limnological Principle 2-3-3** Describes methods and procedures necessary to design and implement a monitoring and surveillance program including sampling, collecting and interpreting data for corrective action and the filing of required reports. Also includes maintenance of laboratory inventories of supplies and equipment, training techniques and the handling of visitors. Prerequisite: ECT 101
21	26	25	**ECT 112 Environmental Biology 3-0-3** A course designed to describe and analyze the biologic and health effects on man and his environment caused by man induced pollution. Includes an overview of basic ecologic principles. Prerequisite: ECT 101
63	6	3	**ECT 120 Ambient Air Sampling and Analysis 2-4-4** Principles and practice of ambient air sampling, ambient survey sampling methods and analytical techniques applied to particulate and gaseous pollutants. Prerequisite: None
43	21	8	**ECT 121 Introduction to Source Sampling and Analysis 2-4-4** Review of ambient sampling. Gas laws and psychometry. methods of determination of gas velocity and flow rate. Equipment and preparations necessary for source sampling for particulates. Prerequisite: ECT 120
24	26	22	**ECT 122 Advanced Source Sampling and Analysis 2-4-4** Review of particulate sampling methods. Study of gaseous-sampling techniques. Analysis for specific gaseous pollutants. Prerequisite: ECT 121, Phys 103.
24	36	12	**ECT 123 Sources of Air Pollution 3-0-3** Familiarization of the major industrial processes with respect to raw materials, processing methods and equipment as they relate to types and quantities of air pollutants. Methodology of source emission inventories. Prerequisite: ECT 101
27	32	13	**ECT 124 Air Pollution Instrumentation 2-4-4** Fundamentals of measurement and errors, measurement of gas temperature, pressure, flow, integrated measurement systems, specialized air pollution sampling equipment, analytical instrumentation, microscopy. Emphasis on instrument use, calibration and limits of accuracy. Prerequisite: ECT 120, Phys. 104
17	37	18	**ECT 125 Air Pollution Control 3-4-5** Objectives and methods of air pollution control. Control equipment classes studied include mechanical collectors, filtration devices, wet collectors, electrostatic precipitators, gas absorption, adsorption and incineration. Also, equipment testing for evaluation, economics of control equipment, and field trips to observe practical use of control equipment. Prerequisite: ECT 101

ATTACHMENT # 4

ADDED COMMENTS TO I.H.T. SURVEY

1. Consideration might be given to additional courses in: Industrial Ventilation, Statistics and Respiratory Protection. (3)

2. For the field I.H. the basics of math and chemistry are sufficient. For those planning continued education, calculus and Qualitive and Quantitive Analysis may be essential.

3. The student should have some exposure to elementary statistics, technical report writing, introduction to sampling interpretation and sources of error and also the relationship of the technologist to the rest of the safety and health team.

4. A course or at least a heavy concentration through an existing course in the area of Toxicology would be essential. (2)

5. The principles of epidemiology and biological monitoring need to be worked into the curriculum. (2)

6. The repair and maintenance of I.H. equipment should be covered. (3)

7. Field work under a professional industrial hygienist is a must.

8. A course in Industrial Hygiene Sampling should include: The descriptions, methods of operation and indicated uses of air sampling equipment used in I.H. studies; emphasize the dose-response relationship of contaminants workers encounter and the need to estimate dose by sampling the work environment; also included sampling strategies and normal distribution statistics.

9. Suggest the following specialized courses: Recognition and Evaluation of Health Hazards (3 credit hours); Statistics, Biometry (3 credit hours); Industrial Hygiene Sampling (2-4-4 credit hours).

10. Strongly suggest your Bio 100 Medical Terminology, if the student has had no background in Latin.

11. A good understanding of Physics is essential but I'm not sure which of your courses would be best.

12. A lot of higher math is not needed in the field but may be needed as pre-requisites for other essential courses, ie: Chemistry and Physics.

13. A course in Industrial Ergonomics would enhance an I.H.T. as well as your general safety program. Such a course would include: Work Physiology- principles of exercise physiology, capacity to do work, cardiovascular and respiratory responses to do work, environmental effects on work performance. Biomechanics- functional human anatomy, anthropometry, muscle strength, lever system and its application to manual material handling.

14. The attention given to noise control should be expanded beyond its limited application in your present course OCS 105, Industrial Hygiene. Particular emphasis should be spent on noise since it is one of the more important factors currently in industrial hygiene.

15. Your courses in Environmental Control Technology emphasize air and water pollution. Course content for I.H. Technology should be specifically designed for I.H. sampling and analysis. Several new courses may be needed or present ECT reorientation toward I.H. (3)

16. A basic introductory course in Epidemology would be helpful to the I.H.T. student.

17. Consider adding courses or a course that would encompass; evaluating industrial hygiene exposures and methods of exposure control in industrial hygiene. (2)

**NOTE: The numbers that appear in parenthesis following a comment indicate the number of respondents making that same general statement on the survey.

ATTACHMENT # 5.

CONSULTANT'S REPORT

Prepared for Joliet Junior College

Pertaining to the

INDUSTRIAL HYGIENE TECHNOLOGIST

GRANT PROJECT

(Donald E. Ernst, Project Director)

Submitted by:

MR. TONY TOWEY

Certified Industrial Hygienist

Secretary, Chicago Area Chapter

American Industrial Hygiene Association

APRIL 15, 1980

INTRODUCTION: An Industrial Hygienist is a person having a college or university degree or degrees in engineering, chemistry, physics, or medicine or related biological sciences, who, by virtue of special studies and training, has acquired competence in industrial hygiene. Such special studies and training must have been sufficient in all of the listed cognate sciences to provide the abilities:

1. To recognize the environmental factors and stresses associated with work and work operations and to understand their effect on man and his well being;
2. To evaluate, on the basis of experience and with the aid of quantitative measurement techniques, the magnitude of these stresses in terms of ability to impair man's health and well being;
3. To prescribe methods to eliminate, control, or reduce such stresses when necessary to alleviate their effects.

In 1956, the Board of Directors of the American Industrial Hygiene Association (AIHA) set up an ad hoc committee on Certification in the Field of Industrial Hygiene.

In March 1959, this committee recommended that voluntary certification should be conducted by an independent incorporated Board. During the summer of 1959, the AIHA approved the principle of voluntary certification and a Joint Committee of AIHA and the American Conference of Governmental Industrial Hygienists was set up to implement the program.

The Joint Committee met on April 24, 1960, and began the work of establishing criteria for Certification. This committee established the American Board of Industrial Hygiene (ABIH) which has as its activities, the following:

1. To grant and issue to qualified persons, certificates of special training, knowledge, and competence in industrial hygiene, or in an aspect thereof, and to revoke for cause certificates so granted or issued.
2. To receive and act upon applications for certificates, determining by investigation, examination, or otherwise, the fitness of the applicants for such certificates.
3. To provide for maintenance of continued professional qualifications by requiring submission of evidence thereof by the holders of certificates.
4. To maintain a roster of holders of certificates granted by the corporation.
5. To furnish to the public, and to interested persons or organizations, lists of those persons having special training, knowledge, and competence in industrial hygiene as evidenced by certificates granted by the corporation.

The first examination given by the ABIH was in May of 1963.

The American Board of Industrial Hygiene issues three categories of certification. Certification for industrial hygienists is in recognition of special education, long experience, and proven professional ability in the comprehensive practice of industrial hygiene or in the application of a specialized aspect of industrial hygiene. The specialized aspects are designated by the words acoustical, air pollution, chemical engineering, radiological, and toxicological. Certification for industrial hygienists in

training is in recognition of special education in and knowledge of the basic principles of industrial hygiene. Certification for industrial hygiene technologists is in recognition of special education, experience and technical ability in conducting industrial hygiene operations.

The purpose of this document is to discuss the concept of certification for industrial hygiene technologists and establish a sequence of courses which will assist in providing students with:

1. Adequate academic credentials to seek employment as an Industrial Hygiene Technologist.
2. A sufficient academic background to support the student's preparation for IHT Certification by the American Board of Industrial Hygiene.
3. A sound academic foundation from which students could continue their professional development.

The Certification of Industrial Hygiene Technologists was begun by the ABIH in 1976 as a recognition of the growing need for technicians to work with professional industrial hygienists. In October, 1975, the ABIH defined an Industrial Hygiene Technologist as, "a person who, by virtue of special studies and training, has acquired proficiency in an aspect or phase of industrial hygiene, e.g., air sampling, monitoring, instrumentation, specialized investigations or specialized laboratory procedures, and who performs such duties under the supervision of an industrial hygienist."

The minimum eligibility requirements for admission to the examination are:

1. Good moral character and high ethical standing.

2. Five years of experience in industrial hygiene under the direction of a Certified Industrial Hygienist, subsequent to receipt of a high school diploma.

   a. An associate degree from an accredited institution in engineering, industrial hygiene, or environmental sciences may be accepted by the Board as equivalent to two years of experience.

   b. Completion of two years in an accredited college or university with satisfactory completion of introductory courses in chemistry, physics, biology, and mathematics may be accepted by the Board as equivalent to one year of experience.

   c. The applicant must have spent at least 25 percent of his/her time in industrial hygiene activities during each year for which credit is claimed.

With this background, I would propose the following curriculum:

FIRST YEAR

FIRST SEMESTER

COURSE NO.	TITLE	CREDIT
MATH 121	Technical Math.	3
CHEM 101	General Chemistry	5
ECT 101	Introduction to Environmental Technology	3
COM 101	Speech	3
OCS 105	Industrial Hygiene I	3
		17

SECOND SEMESTER

MATH 122	Technical Math.	3
CHEM 102	General Chemistry	5
MGMT 103	Occupational Safety and Health	3
OCS 106	Industrial Hygiene II	3
ECT 112	Environmental Biology	3
		17

SUMMER

OCS 210	Internship in Occupational Safety (Industrial Hygiene Placement)	3

SECOND YEAR

FIRST SEMESTER

COURSE NO.	TITLE	CREDIT
PHYS 103	Technical Physics	4
ECT 123	Sources of Air Pollution	3
ECT 120	Ambient Air Sampling	4
ECT 110	Instrumentation	3
ELECTIVE	Social Science Elective	3
		17

SECOND SEMESTER

PHYS 104	Technical Physics	4
ECT 121	Introduction to Source Sampling	4
ECT 125	Air Pollution Control	5
ENG 112	Technical Report Writing	3
		16

Total Hours required 70

This curriculum will utilize existing courses with the following exceptions:

1. OCS-105 is to be expanded to a two semester course.
2. A summer internship in Industrial Hygiene similar to that which is presently a part of the Occupational Safety curriculum.

With respect to item number one, I am appending to this report suggested course outlines for each of the two semesters of OCS-105. These are intended as suggestions which can be taught using any Basic Industrial Hygiene textbook. A suggested text would be Fundamentals of Industrial Hygiene - National Safety Council - Chicago, IL, 1979.

With respect to item number two, the program developed for OCS-210 would need to be modified to include, ". . . gain insight in the operational, administrative and supervisory responsibilities of an industrial hygiene unit . . ."

In setting up this curriculum, I have sought out the assistance of Allen L. Cudworth who is Chairman for the committee on the Accreditation of Industrial Hygiene programs. In our discussion, I was infomed that the committee will meet during the National Conference which is scheduled for the week of May 19-23, 1980, in Houston, Texas. Mr. Cudworth indicated that the feeling of the committee in previous meetings was that they were more in favor of a generalized program in the area of the Associated degree program.

It is my opinion, based on my conversation with Mr. Cudworth, that the sequence that I have proposed for Joliet Junior College will meet or exceed the criteria that eventually will be developed by his committee.

ATTACHMENT # 5A.

JOLIET JUNIOR COLLEGE

COURSE OUTLINE

(Revision)

Course Prefix and Number OCS 105 Title Industrial Hygiene I

Lecture 3 / Lab 0 / Credit 3

Prerequisites: None

Catalog Description: An introduction to the problem of organic or systematic damage to the human organism as a result contact with potential health hazards unique to certain work tasks or work places. Emphasis on hazard recognition of many common occupational health problems. A survey of governmental health regulations is included as well as prevention & control methods. Required for all safety students.

Textbook:

Title	Edition
Fundamentals of Industrial Hygiene	1979
Author	**Publisher**
Olishifski & McElroy	National Safety Council

Comments: (Readings, projects, papers, unique objectives, supplemental text)

(Refer to attached outline0

Attached Course Outline Written by Tony Towey, CIH Date 3/80

Approved by Maynard Boudreau Date 4-21-80
(Appropriate Dean)

FIRST SEMESTER

TOPIC

INTRODUCTION TO OCCUPATIONAL HEALTH

INTRODUCTION TO INDUSTRIAL HYGIENE

LUNGS AND DISEASES OF THE LUNGS

SKIN AND DISEASES OF THE SKIN

INDUSTRIAL TOXICOLOGY

TLV's AND PEL's

CANCER

HAZARD RECOGNITION - SOLVENTS

GENERAL METHODS OF ENVIRONMENTAL EVALUATION

HAZARD RECOGNITION - PARTICULATES

HAZARD RECOGNITION - ASBESTOS

AIR SAMPLING DEVICES

PERSONAL SAMPLING PUMPS

GRAB SAMPLING PUMPS

GOVERNMENTAL HEALTH REGULATIONS

COURSE OUTLINE

OCS 105

INDUSTRIAL HYGIENE I

TOPIC

INTRODUCTION TO OCCUPATIONAL HEALTH

INTRODUCTION TO INDUSTRIAL HYGIENE

LUNGS AND DISEASES OF THE LUNGS

SKIN AND DISEASES OF THE SKIN

INDUSTRIAL TOXICOLOGY

TLV's AND PEL's

CANCER

HAZARD RECOGNITION - SOLVENTS

GENERAL METHODS OF ENVIRONMENTAL EVALUATION

HAZARD RECOGNITION - PARTICULATES

HAZARD RECOGNITION - ASBESTOS

AIR SAMPLING DEVICES

PERSONAL SAMPLING PUMPS

GRAB SAMPLING PUMPS

GOVERNMENTAL HEALTH REGULATIONS

Introduction to Occupational Health

OBJECTIVES:

1. To be able to name two "significant persons" and their contribution to the progess of control of occupational diseases.

2. To be able to name two specific pieces of legislation which sought to prevent occupational diseases.

3. To be able to name two complicating factors in setting health standards.

I. OCCUPATIONAL HEALTH

A. Historical Perspective

1. Ancient

2. Middle Ages

3. Modern

B. Legislation

1. British

2. American

C. Complicating Factors

1. Definition of Occupational Diseases

2. Cause and Effect Relationship

3. Incidence Rates

4. Reporting of Occupational Diseases

5. Individual Susceptibility

6. Benefit vs. Risk

D. Occupational Diseases Filmstrip (NIOSH)

Developed by Tony Towey
9/79

Introduction To Industrial Hygiene

OBJECTIVES:

1. To be able to name and describe the four functions of an Industrial Hygienist.
2. To be able to name at least four environmental stresses.
3. To be able to name at least three professionals involved with occupational health who work with Industrial Hygienists.

I. INDUSTRIAL HYGIENE

- A. Definition
- B. Meaning of Terms
  - 1. Environmental Stress
    - a. Chemical
    - b. Physical
    - c. Biological
    - d. Human Factors
  - 2. Recognition
    - a. By Senses
    - b. By knowledge
  - 3. Evaluation
    - a. Instrumentation
    - b. Compare to a Standard
  - 4. Control
    - a. At Source
    - b. At Employee
    - c. Along the Path
  - 5. Training and Education

II. OTHER SAFETY AND HEALTH PROFESSIONALS

A. Physician

B. Nurse

C. Safety Person

D. Epidemiologist

E. Toxicologists

III. REVIEW - MOVIE "3M's LIVING WITH DUST"

Lungs and Their Diseases

OBJECTIVES:

1. To be able to name the major structures of the respiratory system and describe their functions.
2. To be able to describe the dynamics of lung functions as a means of gas exchange.
3. To be able to describe two means by which the lung is able to clear particles.
4. To be able to describe the pulmonary function test.
5. To be able to define both obstructive and restrictive lung diseases and give examples of chemicals that cause each type.

I. ANATOMY OF RESPIRATORY SYSTEM

- A. Airways
- B. Lungs
- C. Muscles
- D. Protection Mechanisms
  - 1. Upper Respiratory Systems
  - 2. Deep Respiratory System

II. DYNAMICS OF BREATHING

- A. Muscular Control
- B. Neural Control

III. GAS EXCHANGE

- A. Diffusion Principles
- B. Partial Pressures of O_2 and CO_2

IV. PULMONARY FUNCTION TESTS

- A. Terminology
- B. Measurements

IV. PULMONARY FUNCTION TESTS (CONTINUED)

C. Interpretation of Results

V. LUNG DISEASES

A. Obstructive

B. Restrictive

Developed by Tony Towey
9/29

Skin and Its Diseases

OBJECTIVES:

1. To be able to name the major structures of the skin and describe their functions.
2. To be able to describe the major functions of the skin.
3. To be able to name at least two predisposing factors toward dermatitis.
4. To be able to differentiate between a primary irritant and an allergen and give examples of each.
5. To be able to list three industrial causes of dermatitis.
6. To be able to list three methods for prevention of dermatitis.

I. INTRODUCTION

- A. History
- B. Structures of the Skin
  - 1. Epidermis
  - 2. Dermis

II. CAUSES OF DERMATITIS

- A. Predisposing Factors
- B. Direct Causes
  - 1. Chemicals
    - a. Primary Irritants
    - b. Sensatizers
    - c. Photo Chemicals
  - 2. Mechanical
  - 3. Physical
  - 4. Biological

III. PREVENTION OF DERMATITIS

- A. Engineering Controls
- B. Personal Hygiene

III. PREVENTION OF DERMATITIS (CONTINUED)

C. Protective Clothing

D. Barrier Creams

IV. REVIEW - NIOSH FILM STRIP

Industrial Toxicology

OBJECTIVES:

1. To be able to identify the major routes of entry into the human body.
2. To be able to define the major terms used in toxicology.
3. To be able to describe the major tests used to describe the effects of a given material on the human body.
4. To be able to derive a dose response curve from given data and interpret its meaning.

I. TERMINOLOGY

- A. Toxicology
- B. Toxicity vs. Hazard
- C. Acute vs. Chronic
- D. Local vs. Systemic

II. ROUTES OF ENTRY

- A. Skin Absorption
- B. Inhalation
- C. Ingestion
- D. Membrane Barriers
- E. Chemical Pathways

III. DOSE RESPONSE

- A. Responses
- B. Tests
  - 1. Acute
  - 2. Prolongued
  - 3. Chronic
  - 4. Special
    - a. Mutagenic

III. DOSE RESPONSE (CONTINUED)

b. Teratogenic

c. Carcinogenic

C. Distribution of Data

1. Frequency Distribution

2. Cumulative Frequency

D. Hypothetical Response Curve

E. Carbon Monoxide Curves

F. TLV Concept

Developed by Tony Towey
9/79

TLV'S AND PEL'S

OBJECTIVES:

1. To be able to define TLV, TWA, PEL, ANSI, PPM, mg/M^3, mppcf, f/cc, ceiling value, skin cautions, and excursions.
2. To be able to calculate an 8 hour time weighted average.
3. To be able to identify the various responses used in selling a TLV.

I. INTRODUCTION

- A. TLV Concept
  - 1. Dose Response Relationships
  - 2. Safety Factors
- B. Biological Basis of TLV's
  - 1. Animal
  - 2. Human
  - 3. Epidemiological
- C. Terminology
  - 1. PEL vs. TLV
  - 2. PPM
  - 3. mg/M^3
  - 4. mppcf
  - 5. f/cc
  - 6. Ceiling Value
  - 7. Skin Caution
  - 8. Excursions

II. 8 HOUR TIME WEIGHTED AVERAGE

- A. Formula and Calculations
- B. Problem Sessions

Developed by Tony Towey
9/79

Cancer

OBJECTIVES:

1. To be able to describe the stages of progression of cancer.
2. To be able to describe the possible treatments for cancer.

I. INTRODUCTION

- A. Characteristics of Normal Cells
- B. Characteristics of Cancer Cells
- C. Historical Perspectives

II. TYPES OF CANCERS

- A. Carcinoma
- B. Sarcoma
- C. Leukemias
- D. Lymphomas
- E. Others

III. STATES OF PROGRESSION

- A. Local
- B. Regional
- C. Advanced

IV. OCCUPATIONAL CARCINOGENS

- A. Organic
- B. Inorganic

v. CONTROL OF OCCUPATIONAL CARCINOGENS

VI. FILM EMBATTLEO CELL (NATIONAL CANCER SOCIETY)

Developed by Tony Towey
9/79

Hazard Recognition - Solvents

OBJECTIVES:

1. To be able to name four of the major solvent groups and give an example of each.
2. To be able to describe the two major effects of solvents on the human body.
3. To be able to define flash point, LEL and UEL.
4. To be able to describe at least two sources of solvent exposures in industry.

I. INTRODUCTION

- A. Source of Solvents
- B. Behavior of Solvent Vapors
- C. Major Types
  1. Aliphatic
  2. Aromatic
  3. Halogenated
  4. Ketones
  5. Alcohols

II. PHYSIOLOGICAL EFFECTS

- A. Irritation
- B. Anaesthetic
- C. Vapor Volumns

III. FLAMMABLE LIMITS

- A. LEL
- B. UEL
- C. Flash Point

IV. INDUSTRIAL SOURCES

A. Open Surface Tanks

B. Paint Spray Operations

C. Miscellaneous

Developed by Tony Towey
9/79

General Methods of Environmental Evaluation

OBJECTIVES:

1. The trainee should be able to enumerate differences between grab and continuous samples.
2. The trainee should be able to list several differences between direct-reading and lab analytical samples.
3. The trainee should be able to give three (3) examples of primary and secondary factors to consider in obtaining representative air samples.

I. DEFINING THE EXPOSURE

- A. Why Evaluate the Environment
  - 1. To Determine Sources of Contaminants
  - 2. To Determine Exposures
  - 3. To Supply Information to Aid in Recommending Controls
- B. Representative Air Samples
  - 1. Primary Factors to Consider
  - 2. Secondary Factors
  - 3. Taking a Valid, Accurate Sample
- C. Types of Sampling Environments Encountered
  - 1. Dusts, Particulates
  - 2. Gases, Vapors

II. TYPES OF SAMPLES

- A. Grab Sample
- B. Continuous or Integrated Samples

III. TYPES OF MEASURING INSTRUMENTS

- A. Direct Reading
  - 1. Electrical

III. TYPES OF MEASURING INSTRUMENTS (CONTINUED)

2. Color Change and Length of Stain

B. Laboratory Analysis Type Samples

Developed by Tony Towey
9/79

Hazard Recognition - Particulates

OBJECTIVES:

1. To be able to classify particles by size and give the physiological significance of each.
2. To be able to describe at least two sources of particulates in the workplace.
3. To be able to describe how to evaluate the need for monitoring of particulates in the workplace.

I. INTRODUCTION

- A. Source of Particulates
- B. Size of Particles
- C. Behavior of Particles in Air
- D. Behavior of Particles in Respiratory System

II. TYPES OF PARTICLES

- A. Silica
- B. Metal Dusts
- C. Metal Funes
- D. Combustibles

III. OCCUPATIONAL SOURCES

- A. Grinding, Polishing and Buffing
- B. Abrasive Blasting
- C. Soldering and Welding
- D. Smelting
- E. Foundries
- F. Miscellaneous

Developed by Tony Towey
9/79

Hazard Recognition - Asbestos

OBJECTIVES:

1. To be able to describe the major forms of asbestos and their useage.
2. To be able to describe at least three major effects of asbestos on man.
3. To be able to describe the requirements for working with asbestos
4. To be able to describe the method of sampling for asbestos.

I. INTRODUCTION

- A. What is Asbestos
- B. Uses For Asbestos
- C. Toxicology

II. REQUIREMENTS

- A. History of Standard
- B. Major Requirements

III. Sampling Methods.

- A. Open Face
- B. Multi Ring Cassette

Developed by Tony Towey
9/79

Air Sampling Devices

OBJECTIVE: To be able to describe the different methods of sample collection and be able to describe the relative efficiencies of each.

I. INTRODUCTION TO SAMPLING DEVICES

II. METHODS OF COLLECTION OF PARTICULATES

- A. Direct Interception
  - 1. General Ideas
  - 2. Membrane Filters
- B. Inertial Collectors
  - 1. General Ideas
  - 2. Fibrous Filters
  - 3. Elutriators
  - 4. Impingers
  - 5. Impactors
  - 6. Cyclones
- C. Precipitators
  - 1. Electrostatic
  - 2. Thermal
- D. Wipe Sampling

III. METHODS FOR COLLECTION OF GASES AND VAPORS

- A. Evacuated Containers
- B. Absorbers
- C. Adsorbers

REFERENCE: The Industrial Environment - Its Evaluation and Control - NIOSH

Developed by Tony Towey
9/79

Personal Sampling Pumps

OBJECTIVES:

1. To be able to calibrate a personal sampling pump.
2. To be able to put both a cassette and a cyclone together.
3. To be able to describe how a personal sampling pump operates.

I. INTRODUCTION TO PUMPS

- A. Piston Pump
- B. Orifice Pump

II. CALIBRATION

- A. Assembly
  - 1. Cassette
  - 2. Cyclone
- B. Set Up
- C. Pre-calibration Check
- D. Calibration Lab.

III. REVIEW

Developed by Tony Towey
9/79

Grab Sampling Pumps

OBJECTIVE: To be able to correctly use a grab sampling pump and realize its limitations.

I. INTRODUCTION

II. TUBES (ACCURACY AND LIMITATIONS)

- A. Chemical Reaction
- B. Flow Rate - Speed of Reaction
- C. Manufacturing Limits

III CALIBRATION

- A. Leak Tests
- B. Calibration Lab.

IV. REVIEW

Developed by Tony Towey
9/79

Governmental Health Regulations

OBJECTIVES:

1. To be able to define the following terms: action level, work practice standard and technology stimulating standard.
2. To be able to describe the logic of a work practice standard.
3. To describe an engineering design standard.

I. GOVERNMENT REGULATIONS

- A. PEL
- B. Engineering Design
- C. Work Practice Standard
  1. With a PEL
  2. With an Action Level
  3. Technology Stimulating
  4. With a Biological Indicator

Developed by Tony Towey
9/79

ATTACHMENT # 58.

JOLIET JUNIOR COLLEGE

COURSE OUTLINE

Course Prefix and Number OCS 106 Title Industrial Hygiene II

Lecture 3 / Lab 0 / Credit 3

Prerequisites: Math 121, Chemistry 101, Occupational Safety 105 or demonstrate proficiencies to the Instructor.

Catalog Description:

A continuation of OCS 105, Industrial Hygiene I for the occupational health student. This advanced course deals with hazard recognition in the areas of noise, radiation, and thermal stress. Principles of ventilation are discussed and demonstrated. The student is familiarized with personal protective equipment.

Textbook:

Title	Edition
Fundamentals of Industrial Hygiene	1979
Author	**Publisher**
Olishifski & McElroy	National Safety Council

Comments: (Readings, projects, papers, unique objectives, supplemental text)

(Refer to attached outlines)

Attached Course Outline Written by Tony Towey, CIH Date 3/80

Approved by Maynard Dovdreau Date 4-21-80
(Appropriate Dean)

SECOND SEMESTER

TOPIC
AUDIOLOGY
HAZARD RECOGNITION - NOISE
NOISE LABORATORY
HAZARD RECOGNITION - TEMPERATURE EXTREMES
GENERAL METHODS OF CONTROL
INTRODUCTION TO RESPIRATORY TERMINOLOGY
ELEMENTS OF A MINIMAL ACCEPTABLE RESPIRATOR PROGRAM
PERSONAL PROTECTIVE EQUIPMENT
HAZARD RECOGNITION - IONIZING RADIATION
HAZARD RECOGNITION - NONIONIZING RADIATION
GENERAL VENTILATION PRINCIPLES
PRINCIPLES OF LOCAL VENTILATION
VENTILATION LABORATORY

COURSE OUTLINE

OCS 106

INDUSTRIAL HYGIENE II

TOPIC

AUDIOLOGY

HAZARD RECOGNITION - NOISE

NOISE LABORATORY

HAZARD RECOGNITION - TEMPERATURE EXTREMES

GENERAL METHODS OF CONTROL

INTRODUCTION TO RESPIRATORY TERMINOLOGY

ELEMENTS OF A MINIMAL ACCEPTABLE RESPIRATOR PROGRAM

PERSONAL PROTECTIVE EQUIPMENT

HAZARD RECOGNITION - IONIZING RADIATION

HAZARD RECOGNITION - NONIONIZING RADIATION

GENERAL VENTILATION PRINCIPLES

PRINCIPLES OF LOCAL VENTILATION

VENTILATION LABORATORY

AUDIOLOGY

OBJECTIVES:

1. To be able to describe the anatomy and physiology of the hearing mechanism.
2. To be able to identify at least two causes of hearing loss.
3. To be able to describe the method for taking an audiogram.
4. To be able to interpret the type of hearing loss from a simple audiogram

I. MECHANISM OF HEARING

- A. Structures
- B. Conduction of Sound
- C. Perception of Sound

II. HEARING LOSS

- A. Conductive
- B. Sensorineural

III. NOISE INDUCED HEARING LOSS

- A. Temporary Threshold Shift
- B. Permanent Threshold Shift

IV. MEASUREMENT OF HEARING

- A. Audiometers
- B. Audiograms

V. PERSONAL PROTECTIVE DEVICES

HAZARD RECOGNITION - NOISE

OBJECTIVES:

1. To be able to describe the physical properties of sound and units of expression used.

2. To be able to understand the relationship between sound measurement and perception of sound.

3. To be able to understand the General Industry Noise Standard and be able to calculate time weighted averages for noise exposures.

I. PHYSICS OF SOUND

   A. Definition of Noise

   B. Characteristics of Sound

      1. Wavelength

      2. Frequency (cps vs. Hz)

      3. Sound Pressure

      4. Sound Intensity

      5. Sound Power

   C. Properties of Sound

      1. Propagation through Matter (velocity)

      2. Reflection

      3. Absorption

II. MEASUREMENT OF SOUND

   A. Concept of Decibel Scale of Measurement

      1. Log Scale

      2. Definition of Decibel

HAZARD RECOGNITION - NOISE (CONTINUED)

B. Sound Pressure Level

1. Defnitions of Sound Pressure Units

2. Formula: $L_p = 20 \log \frac{P}{P_o}$ dB

3. Addition and Subtraction of Decibels

C. Sound Intensity Level

1. Defnition of Watt

2. Formula: $Lw = 10 \text{ Log } \frac{W}{W_o}$

III. EXPLANATION OF OSHA NOISE STANDARD 1910.95

A. A-weighting Network

B. Table G-16

C. Time-weighted Average

D. Impact Noise

V. CALCULATIONS OF TIME -WEIGHTED AVERAGES

NOISE LABORATORY

OBJECTIVES:

1. To be able to describe the types, purposes, and general use of sound level meters, dosimeters and octave band analyzers.

2. To be able to describe the proper calibration of sound level meters and dosimeters.

I. SOUND LEVEL METER

   A. What is it?

   B. How does it Work?

   C. How do you Calibrate it?

II. DOSIMETERS

   A. What is it?

   B. How does it Work?

   C. How do you Calibrate it?

III. OCTAVE BAND ANALYZER

   A. What is it?

   B. How does it Work?

   C. How do you Calibrate it?

IV. NOISE MEASUREMENT LAB.

HAZARD RECOGNITION - TEMPERATURE EXTREMES

OBJECTIVES:

1. To be able to identify the ways in which the human body reacts to maintain a constant internal temperature during changes in the external environment.
2. To be able to define heat stress and cold stress and identify the resulting effects on the human body.
3. To be able to define heat balance equation and explain its components.
4. To be able to identify indices for evaluating both hot and cold environments.

I. INTRODUCTION TO TEMPERATURE STRESS

- A. Body Temperature Regulation - Homeostasis
- B. Heat Production
- C. Heat Loss

II. INTRODUCTION TO HEAT STRESS

- A. Definitions
  1. Heat stress
  2. Heat strain
  3. Temperature
  4. Humidity
  5. Effective temperature index
- B. Illnesses
  1. Heat cramps
  2. Heat exhaustion
  3. Heat stroke
  4. Heat rash and syncope

HAZARD RECOGNITION - TEMPERATURE EXTREMES (CONTINUED)

III. PRODUCTION AND REGULATION OF BODY HEAT

- A. Sources of Heat Stress
  - 1. Metabolic
  - 2. Environmental Heat
- B. Regulation of Body Temperature - Blood Circulation
- C. Heat Exchange and Environmental Factors

IV. ACCLIMATIZATION TO HEAT

V. ENVIRONMENTAL MEASUREMENTS AND HEAT STRESS INDEX

VI. INTRODUCTION TO COLD STRESS

VII. PHYSIOLOGICAL FACTORS AND THE EFFECT OF COLD

- A. Physiological Response to Cold in the Homeotherm
- B. Limitations of Cold Stress

GENERAL METHODS OF CONTROLS

OBJECTIVES:

1. To be able to identify the general methods of controlling airborne hazards and give short examples of each method.
2. To be able to identify the criteria for applications, the positive features, and the shortcomings of general methods of controlling airborne hazards.

I. INTRODUCTION

II. CHARACTERIZATION OF EXPOSURE TO BE CONTROLLED

- A. Physical and Chemical Properties of Contaminant
- B. Contaminant Emission Characteristics
- C. Characteristics of Employee Exposure

III. CONTROL STRATEGIES

- A. General Philosophy of Exposure Control
- B. Engineering Controls
  1. Substitution of
  2. Isolation and Enclosure
  3. Process Control Changes
  4. Ventilation
- C. Work Practice Controls
- D. Administrative Controls
- E. Personal Protective Clothing and Equipment

IV. INDUSTRIAL EXAMPLES

INTRODUCTION TO RESPIRATOR TERMINOLOGY

OBJECTIVES:

1. To be able to describe the principles of operation of both air purifying and atmosphere supplying respirators.

2. To be able to describe the limitations of both air purifying and atmosphere supplying respirators.

I. AIR PURIFYING DEVICES

   A. Mechanical Filters (DFM)

      1. Particulate Removing

      2. Gas and Vapor Removing

         a. Cartridges (50 - 200 cc)

         b. Canisters

      3. Combination - Particulate/Gas or Vapor Removing

   B. Atmosphere Supplying

      1. Supplied Air

      2. Combination S.C.B.A./Airline

      3. S.C.B.A.

         a. Closed Circuit

         b. Open Circuit

ELEMENTS OF A MINIMAL ACCEPTABLE RESPIRATOR PROGRAM

OBJECITVES:

1. To be able to describe the elements of a minimal acceptable respirator program.

2. To be able to determine how effective a given respirator program is.

I. ELEMENTS OF A PROGRAM

A. Written Operating Procedures - 1910.134(b)(1),(e)(1), & (e)(3)

B. Proper Selection - 1910.134(b)(2) & (c)

C. Training and Fitting - 1910.134(b)(3), (e)(5), & (e)(5)(i-iii)

D. Exclusive Employee Use - 1910.134(b)(4)

E. Cleaning and Disinfecting - 1910.134(b)(5) & (f)(3)

F. Storage - 1910.134(b)(6) & (f)(5)(i-iii)

G. Inspection and Maintenance - 1910.134(b)(7) & (f)(2)(i-iv) & (f)(4)

H. Work Area Surveillance - 1910.134(b)(8)

I. Inspection and Evaluation to Determine Effectiveness - 1910.134(b)(9) & (e)(4)

J. Medical Examinations - 1910.134(b)(10)

K. Approved Respirators - 1910.134(b)(11)

L. I.D.L.H. Atmospheres - 1910.134(e)(3)(i) thru (iii)

M. Identification of Gas Mask Canisters - 1910.134(g)

N. Air Quality - 1910.134(d)

II. CRITERIA FOR EFFECTIVENESS OF THE PROGRAM

PERSONAL PROTECTIVE EQUIPMENT

OBJECTIVES:

1. To be able to describe the way in which an ANSI Requirement is developed and kept current.

2. To be able to describe the method of testing head, foot, face and eye protectors under the ANSI Requirements.

3. To be able to recognize ANSI approved personal protective equipment.

I. INTRODUCTION TO PROTECTIVE EQUIPMENT

   A. American National Standards Institute (ANSI)

   B. General Overview

II. EYE AND FACE PROTECTION

   A. Criteria

   B. Design Testing

   C. Examples

III. HEAD PROTECTION

   A. Criteria

   B. Design Testing

   C. Examples

IV. FOOT PROTECTION

   A. Criteria

   B. Design Testing

   C. Examples

V. OTHER PROTECTIVE DEVICES

HAZARD RECOGNITION IONIZING RADIATION

OBJECTIVES:

1. To be able to identify the scope of ionizing radiation and its effect on the human body.
2. To be able to define the terms roentgens, rads, rems, and identify the interrelationship of these units.
3. To be able to identify the common industrial sources of ionizing radiation and how they are controlled.

I. RADIATION FUNDAMENTALS

- A. Structure of Matter
  - 1. Molecules and Atoms
  - 2. Subatomic Structure
- B. Radioactivity and Radiation
  - 1. Types of Radioactive Emission
    - A. Waves
    - B. Particles
  - 2. Half Life

II. BIOLOGICAL EFFECTS

- A. Introduction
- B. Damage Mechanism
- C. Cellular Effects.
- D. Allowable Dose
- E. Background Dose

III. INDUSTRIAL SOURCES

HAZARD RECOGNITION - NON IONIZING RADIATION

OBJECTIVES:

1. To be able to identify the scope of non ionizing radiation and the major types of it.
2. To be able to identify the common industrial sources of non ionizing radiation.
3. To be able to describe the biological effects of non ionizing radiation.

I. TYPES OF NON IONIZING RADIATION

- A. UV and IR
- B. Microwaves and Radiowaves
- C. Laser

II. BIOLOGICAL EFFECTS

- A. Skin
- B. Eye
- C. Internal Organs

III. INDUSTRIAL APPLICATIONS

GENERAL VENTILATION PRINCIPLES

OBJECTIVES:

1. To be able to describe the advantages and disadvantages in using dilution ventilation.
2. To be able to calculate the vapor volumn generatured per volumn for a given solvent.
3. To be able to calculate the amount of diluation air necessary to control any given solvent.

I. INTRODUCTION TO GENERAL VENTILATION

- A. Sources
- B. Vapor Generation Rate
  - 1. Dependents
  - 2. Calculations
- C. Examples Problems

II. VAPOR CONCENTRATION IN A ROOM

- A. Vapor Volumn Calculations
- B. Room Dimensions

III. DILUTION VOLUMN CALCULATIONS

- A. Calculations
- B. Example Problems

IV. LIMITATIONS TO USAGE

PRINCIPLES OF LOCAL VENTILATION

OBJECTIVES:

1. To be able to describe each portion of a local exhaust system and its function.
2. To be able to calculate air volumns necessary in order to successfully carry contaminants in a local system.
3. To be able to describe the meaning of the numerical measurements taken during a ventilation survey.

I. DEFINITION OF LOCAL EXHAUST VENTILATION

II. COMPONENTS OF SYSTEM

- A. Hood
- B. Duct
- C. Air Cleaner
- D. Fan

III. CALCULATIONS

- A. Volumn $Q = VA$
- B. Pressure $TP = VP + SP$
- C. Velocity $V = 4005 \sqrt{VP}$

IV. MEASUREMENTS

- A. Face Velocity
- B. Duct Velocity

V. SYSTEM ANALYSIS

VENTILATION LABORATORY

OBJECTIVES:

1. To be able to describe how to take a pitot tube traverse.
2. To be able to describe how to measure face velocity.
3. To be able to calculate the volumn of air carried in a system using the measurements taken during a survey.

I. FACE VELOCITY TRAVERSE

   A. Procedure

   B. Calculations

II. PITOT TUBE TRAVERSE

   A. Description of Device

   B. Procedure

   C. Calculations

III. LABORATORY

ATTACHMENT # 6.

American Academy of Industrial Hygiene

475 WOLF LEDGES PARKWAY, AKRON, OH 44311, (216) 762-7707

March 12, 1980

Mr. Don Ernst
Coordinator - Occupational Safety Program
Joliet Junior College
1216 Houbolt Avenue
Joliet, Illinois 60436

Dear Mr. Ernst:

First let me apologize for the time it has taken for you to receive a reply to your letter to Mr. McCormick at the American Board of Industrial Hygiene inquiring about curricula for the development of Industrial Hygiene Technicians. I am replying to your letter on behalf of the American Academy of Industrial Hygiene.

The American Academy of Industrial Hygiene, the organization of Industrial Hygienists certified by the American Board, is now in the process of developing criteria and standards for accreditation of various levels of academic programs in Industrial Hygiene. However, it will probably be at least a year before this effort produces any material which would be of value to you in your present efforts.

In view of this, our suggestion at this time would be for you to use the information provided in the NIOSH (National Institute for Occupational Safety and Health) reports prepared by R. J. Vernon, et. al. on various suggested educational programs. The report covering such programs for Occupational Health and Safety Technicians is referenced in the copy of the DAVTE study attached to your letter. This report was developed through funding provided by the NIOSH Division of Training in Cincinnati. Dr. Tom Purcell is head of the Division of Training and can be contacted at 513-684-8240. The report on a curriculum for Occupational Health and Safety Technicians is Report #7.

Dr. Vernon from Texas A&M, who headed the development of the NIOSH reports, would be available on a consulting basis to provide interpretation of the NIOSH reports. If you wish, we could also provide you with an arbitrary list of universities providing education in Industrial Hygiene which you could contact for further input.

I regret that we have nothing more definitive from the Academy of Industrial Hygiene at this time. However, if you have any further points on which you feel we could help you, please do contact us.

Sincerely yours,

John Yoder

John D. Yoder
President - AAIH

JDY:cl

cc: N. E. Bolton
A. L. Cudworth

Certification of Industrial Hygiene Technicians

Certification of Industrial Hygiene Technologists was established by the American Board of Industrial Hygiene in 1976 in recognition of the growing need for technicians to assist professional industrial hygienists.

Minimum eligibility requirements for admission to the examination include:

1. Good moral character and high ethical standing.
2. Five years of experience in industrial hygiene under the direction of a Certified Industrial Hygienist, subsequent to receipt of a high school diploma. **NOTE: An associate degree from an accredited institution in engineering, industrial hygiene or environmental sciences may be accepted by the Board as equivalent to two years of experience.**
3. The applicant must have spent at least 25 per cent of his time in industrial activities during each year for which credit is claimed.

Although earning a degree in Industrial Hygiene Technology at Joliet Junior College does not guarantee certification, the IHT program does provide sufficient academic background to help students prepare for certification.

The College

Founded in 1901, Joliet Junior College is the nation's oldest public community college. The $30 million college campus, with its own lake, is located on 368 acres on the west side of Joliet.

Joliet Junior College is committed to a policy of nondiscrimination on the basis of sex, handicap, race, color, and national or ethnic origin in the admission, employment, educational programs, and activities it operates. Inquiries should be addressed to the dean of personnel.

For further information, write or call:
Joliet Junior College
Dean of Career Education
1216 Houbolt Avenue
Joliet, IL 60436
Phone (815) 729-9020

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Dean of Career Education
Joliet Junior College
1216 Houbolt Avenue
Joliet, Illinois 60436

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Industrial Hygiene Technology

Illinois Community College
District 525
Joliet Junior College
1216 Houbolt Avenue
Joliet, IL 60436
(815) 729-9020

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Industrial Hygiene Technology

As modern technology becomes more complex and sophisticated, the potential physical hazards in work places become more numerous and less obvious.

Common sense alone is no longer an adequate safeguard against potential occupational accidents and illnesses. Safety and health specialists must be specially trained.

The Industrial Hygiene Technologist (IHT) is concerned with recognizing and controlling environmental elements which could cause sickness, injury, discomfort or inefficiency among workers or citizens in a community.

Industrial Hygiene Technologists must acquire proficiency in aspects of industrial hygiene such as air sampling, monitoring, instrumentation, specialized investigations, or specialized laboratory procedures. These duties are performed under the supervision of an industrial hygienist.

Career Opportunities

The growing national interest in making and keeping work places safe for employees has led to the creation of a variety of job opportunities within the field of industrial hygiene.

The U.S. Department of Labor expects employment for safety and health workers to increase faster than the average for all occupations through the mid-1980's.

The Executive Director of the American Board of Industrial Hygiene has reported that since every professional hygienist requires two to three technicians to do a proper job, this country will need from 25,000 to 40,000 Industrial Hygiene Technicians within the next ten years.

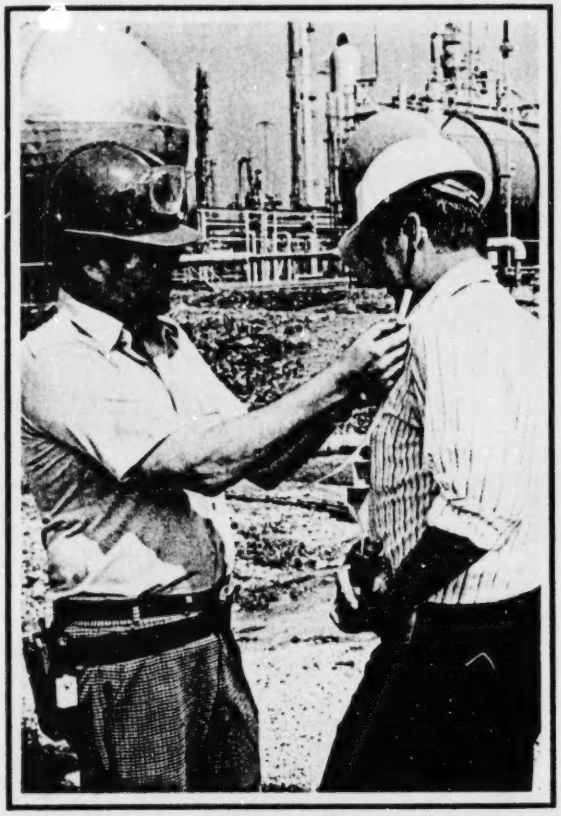
In Illinois, the greatest demand for IHT's is expected to be concentrated in or near the area served by the Joliet Junior College district.

JJC Program

Industrial Hygiene Technology is one of five 2-year Associate in Applied Science Degree options offered at Joliet Junior College within the Occupational Safety and Health program. (The four other options are Fire Protection, Motor Fleet, Safety, Radiation Safety, and Safety Generalist.)

The goals of the JJC program in Industrial Hygiene Technology are threefold. The IHT program will help provide the student with:

- Adequate academic credentials to seek employment as an Industrial Hygiene Technician.
- Sufficient academic background to help the student prepare for IHT Certification by the American Board of Industrial Hygiene.
- A sound academic foundation from which to continue the student's professional development.



Industrial Hygiene Technology Option

Associate in Applied Science Degree
Occupational Safety

FIRST YEAR

First Semester		*Credits*
MATH 121	Technical Mathematics	3
CHEM 101	General Chemistry	5
ECT 101	Introduction to Environmental Technology	3
SPCH 101	Speech	3
OCS 105	Industrial Hygiene I	3
		17

Second Semester		
MATH 122	Technical Mathematics	3
CHEM 102	General Chemistry	5
MGMT 103	Occupational Safety and Health	3
OCS 106	Industrial Hygiene II	3
ECT 112	Environmental Biology	3
		17

Summer		
OCS 210	Internship in Occupational Safety	3

SECOND YEAR

First Semester		
PHYS 103	Technical Physics I	4
ECT 123	Sources of Air Pollution	3
ECT 120	Ambient Air Sampling and Analysis	4
ECT 110	Instrumentation	3
ELECTIVE	Social Science	3
		17

Second Semester		
PHYS 104	Technical Physics II	4
ECT 121	Introduction to Source Sampling and Analysis	4
ECT 125	Air Pollution Control	5
ENG 112	Technical Report Writing	3
		16

Basic Certificate
Occupational Safety

(15 credit hours)

Course		Credits
OCS 101	Introduction to Safety and Accident Prevention	3
OCS 102	Legal Aspects of Accident Prevention	3
FSCI 101	Introduction to Fire Protection	3
MGMT 103	Occupational Safety and Health Act	3
*COMM	Communication	3
		15

Advanced Certificate
Occupational Safety

(30 credit hours)

Course		Credits
OCS 101	Introduction to Safety and Accident Prevention	3
OCS 102	Legal Aspects of Accident Prevention	3
OCS 103	Organization and Management	3
OCS 104	Emergency and Disaster Preparedness	3
OCS 105	Industrial Hygiene	3
OCS 201	Radiation Hazards and Man	3
FSCI 101	Introduction to Fire Protection	3
MGMT 103	Occupational Safety and Health Act	3
*COMM	Communications	3
PSYC 206	Industrial Psychology	3
		30

**Placement in specific courses will be based upon counseling interviews and examinations.*

The College

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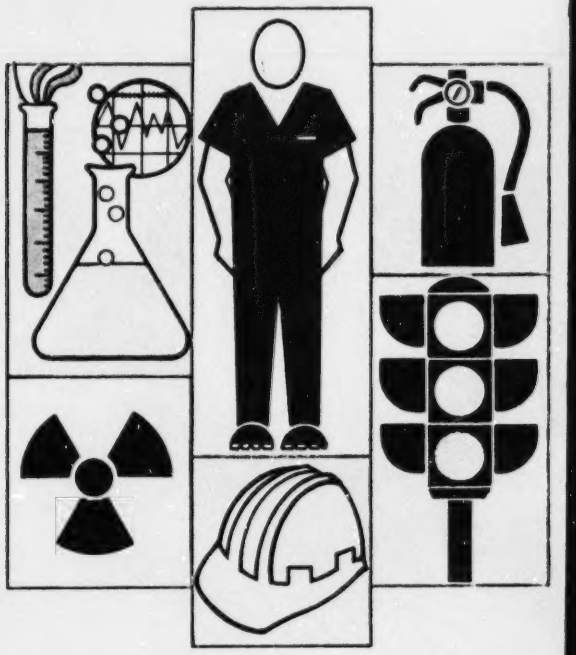
Occupational Safety and Health



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District 525
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1216 Houbolt Avenue
Joliet, IL 60436
(815) 729-9020

Occupational Safety and Health Careers

Persons in the Occupational Safety and Health field are primarily concerned with the prevention of personnel or environmental accidents in work-related situations and the correction of work area problems to guarantee a safe work place.

As modern technology becomes more complex and sophisticated, the potential physical hazards in work places also become more numerous and less obvious.

Common sense alone is no longer an adequate safeguard against potential occupational accidents and illnesses. Safety and health specialists must be specially trained.

The growing national interest in making and keeping work places safe for employees has led to the creation of a variety of relatively new careers in the field of Occupational Safety and Health.

Occupational Safety and Health has become one of the fastest growing technical fields in our nation, offering professional careers with good salary potential and rapid advancement.

Career opportunities in the Occupational Safety and Health field are as numerous and diversified as the various agencies and businesses which require technical safety assistance.

Potential job areas include:

Radiology	Chemical Laboratories
Safety Inspection	Insurance Investigation
Fire Prevention	Construction
Utilities	Materials Handling
Traffic	Safety Engineering
Manufacturing	Environment

Safety Compliance Officers

JJC Courses of Study

The JJC program in Occupational Safety and Health will give professional enrichment to those men and women now in government, business or industry who have safety responsibilities as well as those who would like to become career professionals in the safety field.

The program also provides the necessary academic foundation for students who choose to continue their education beyond the associate degree level.

JJC Program Options

The JJC program includes a 15-semester hour Basic Certificate, a 30-semester hour Advanced Certificate and five 2-year Associate Degree in Applied Science options designed to prepare the generalist safety practitioner as well as specialists in the safety field. The degree options include the following:

Fire Protection Option: *A specialized program for the student desiring a safety background with a concentration in the fire protection area.*

Motor Fleet Safety Option: *A specialized program for the student desiring a background in the traffic safety area.*

Industrial Hygiene Technology Option: *A highly technical program for students with a sufficient mathematics and science background who desire preparation in the industrial health and hygiene area.*

Radiation Safety Option: *A specialized program for the safety student desiring an emphasis in the radiation protection area. Students should have sufficient background to enroll in college algebra, chemistry and physics.*

Safety Generalist Option: *A degree especially structured to permit a personally tailored program for the safety student interested in gaining specialty skills outside the format of other programs. The student will take a core of designated safety courses and select a balance of elective courses approved by the academic advisor within the program.*

Fire Protection Option

Associate in Applied Science Degree
Occupational Safety

FIRST YEAR

First Semester		*Credits*
*COMM	Communications	3
OCS 101	Introduction to Safety and Accident Prevention	3
PSYC 101	General Psychology	3
FSCI 101	Introduction to Fire Protection	3
SPCH 101	Speech	3
		15

Second Semester		
*COMM	Communications	3
OCS 102	Legal Aspects of Accident Protection	3
FSCI 105	Fire Protection Systems	3
ELECTIVE	Social Science	3
ELECTIVE	Science	4-5
		16-17

SECOND YEAR

First Semester		
OCS 103	Organization and Management of Safety Programs	3
PSYC 206	Industrial Psychology	3
OCS 104	Emergency and Disaster Preparedness	3
***ELECTIVE	Fire Science	3
**ELECTIVE		3
		18

Second Semester		
OCS 105	Industrial Hygiene	3
MGMT 103	Occupational Safety and Health	3
OCS 210	Internship in Occupational Safety	3
***ELECTIVES	Fire Science	6
**ELECTIVE	Humanities	3
		18

**Placement in specific courses will be based upon counseling interviews and examinations.*

***Safety students should select an elective from the list of recommended electives in the college catalog.*

****Must be from the following list (See catalog for detailed course descriptions.) FSCI 103, 106, 201, 202, 203, 206, 207, 209.*

Motor Fleet Safety Option

Associate in Applied Science Degree
Occupational Safety

FIRST YEAR

First Semester — Credits

*COMM	Communications	3
PSYC 101	General Psychology	3
OCS 101	Introduction to Safety and Accident Prevention	3
LENF 105	Traffic Administration and Control	3
SPCH 101	Speech	3
		15

Second Semester

*COMM	Communications	3
OCS 102	Legal Aspects of Accident Prevention	3
FSCI 202	Chemistry of Hazardous Materials	3
OCS 103	Organization and Management of Safety Programs	3
ELECTIVE	Science	4-5
		16-17

SECOND YEAR

First Semester

PSYC 206	Industrial Psychology	3
MGMT 103	Occupational Safety and Health	3
OCS 104	Emergency and Disaster Preparedness	3
TRAN 106	Regulation of Transportation	3
LENF 115	Traffic Engineering	3
		15

Second Semester

OCS 105	Industrial Hygiene	3
TRAN 207	Claims and Insurance	3
OCS 210	Internship in Occupational Safety	3
ELECTIVE	Humanities	3
ELECTIVE	Social Science	3
**ELECTIVE		3
		18

**Placement in specific courses will be based upon counseling interviews and examinations.*

***Safety students should select an elective from the list of recommended electives in the college catalog.*

Industrial Hygiene Technology Option

Associate in Applied Science Degree
Occupational Safety

FIRST YEAR

First Semester — Credits

MATH 121	Technical Mathematics	3
CHEM 101	General Chemistry	5
ECT 101	Introduction to Environmental Technology	3
SPCH 101	Speech	3
OCS 105	Industrial Hygiene I	3
		17

Second Semester

MATH 122	Technical Mathematics	3
CHEM 102	General Chemistry	5
MGMT 103	Occupational Safety and Health	3
OCS 106	Industrial Hygiene II	3
ECT 112	Environmental Biology	3
		17

Summer

OCS 210	Internship in Occupational Safety	3

SECOND YEAR

First Semester

PHYS 103	Technical Physics I	4
ECT 123	Sources of Air Pollution	3
ECT 120	Ambient Air Sampling and Analysis	4
ECT 110	Instrumentation	3
ELECTIVE	Social Science	3
		17

Second Semester

PHYS 104	Technical Physics II	4
ECT 121	Introduction to Source Sampling and Analysis	4
ECT 125	Air Pollution Control	5
ENG 112	Technical Report Writing	3
		16

Radiation Safety Option

Associate in Applied Science Degree
Occupational Safety

FIRST YEAR

First Semester

		Credits
*COMM	Communications	3
OCS 101	Introduction to Safety and Accident Prevention	3
PSYC 101	General Psychology	3
MATH 131	College Algebra	4
SPCH 101	Speech	3
		16

Second Semester

*COMM	Communications	3
OCS 102	Legal Aspects of Accident Prevention	3
CHEM 101	General Chemistry	5
MGMT 103	Occupational Safety and Health	3
ELECTIVE	Social Science	3
		17

SECOND YEAR

First Semester

OCS 104	Emergency and Disaster Preparedness	3
PSYC 206	Industrial Psychology	3
OCS 202	Fundamentals of Radiation Protection	3
**ELECTIVES	Radiation Safety	6-8
		15-17

Second Semester

OCS 105	Industrial Hygiene	3
OCS 210	Internship in Occupational Safety	3
ELECTIVE	Humanities	3
ELECTIVES	Radiation Safety	7-8
		16-17

**Placement in specific courses will be based upon counseling interviews and examinations.*

***Electives must be from the following list and include one Physics Course (4-5 credit hours). See the college catalog for detailed course descriptions. ECT 120, 121; PHYS 101, 102, 103, 104; CS 100, 101.*

Safety Generalist Option

Associate in Applied Science Degree
Occupational Safety

FIRST YEAR

First Semester

		Credits
*COMM	Communications	3
OCS 101	Introduction to Safety and Accident Prevention	3
PSYC 101	General Psychology	3
SPCH 101	Speech	3
OCS 104	Emergency and Disaster Preparedness	3
		15

Second Semester

*COMM	Communications	3
OCS 102	Legal Aspects of Accident Prevention	3
ELECTIVE	Social Science	3
ELECTIVE	Science	4-5
ELECTIVE	Safety	3
		16-17

SECOND YEAR

First Semester

OCS 103	Organization and Management of Safety Programs	3
PSYC 206	Industrial Psychology	3
MGMT 103	Occupational Safety and Health	3
***ELECTIVE	Safety	3
**ELECTIVE		3
		15

Second Semester

OCS 105	Industrial Hygiene	3
OCS 210	Internship in Occupational Safety	3
ELECTIVE	Humanities	3
***ELECTIVES	Safety	9
		18

**Placement in specific courses will be based upon counseling interviews and examinations.*

***Safety students should select an elective from the list of recommended electives in the college catalog.*

****Electives must be from the following list. Only six hours are permitted from one specific instructional area. See the college catalog for detailed course descriptions. OCS 201 101; LENF 105, 115; FSCI 101, 105, 202, 207, 209; CHEM 100, 101; ECT 101, 125; CS 100, 101.*

ATTACHMENT # 9.

Article to be used in
1980 Joliet Junior College Fall Focus promotional tabloid

Safety
Careers
Increasing

As modern technology becomes more complex and sophisticated, the potential physical hazards in work places also become more numerous and less obvious.

Government and industry both recognize that common sense alone is not an adequate safeguard against potential occupational accidents and illnesses. Safety and health specialists must be specially trained.

The growing national interest in making and keeping workplaces safe for employees has led to the creation of a variety of relatively new careers in the field of Occupational Safety and Health.

Recent estimates from the U.S. Department of Labor indicate that the employment of safety and health workers will probably increase faster than the average for all occupations through the mid 1980's.

To keep pace with the demands created by these new career opportunities, Joliet Junior College offers an Occupational Safety Program and is currently developing programs in the related areas of Fire Protection, Motor Fleet Safety, Industrial Hygiene Technology, Radiation Safety, and Safety Generalist.

The Occupational Safety program includes a two-year Associate in Applied Science Degree as well as a 30-credit hour Advanced Certificate and a 15-credit hour Basic Certificate.

The Occupational Safety program and the related programs being developed will provide graduates with the necessary background and competence to assume a significant role as a safety generalist or specialist.

Some of the many job opportunities can be found in the areas of radiology, insurance investigation, safety inspection, fire prevention, construction, traffic, materials handling, manufacturing, safety education, safety engineering and safety management, utilities, and chemical laboratories.

For further information about the JJC Occupational Safety program, persons may contact the college at (815) 729-9020, Ext. 264.